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WABASH RIVER BASIN COMPREHENSIVE STUDY. VOLUME IV. APPENDIX-C. --ETC(U)
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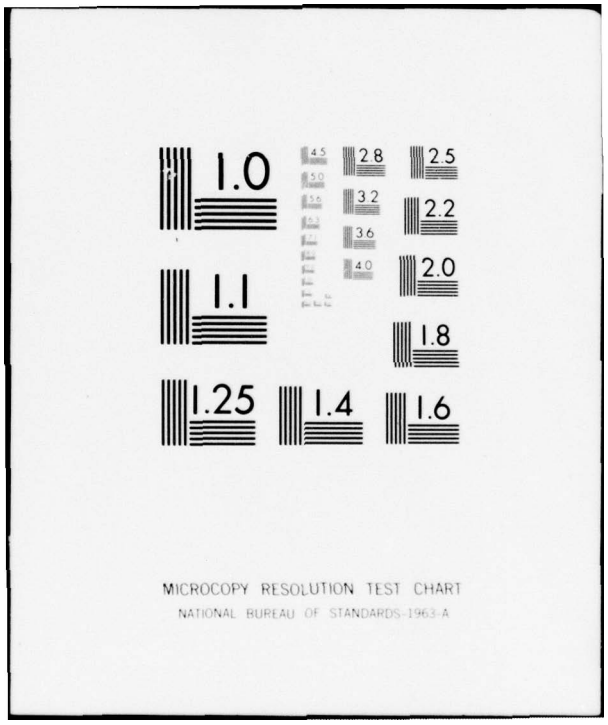
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*Wabash River Coordinating Co*

**WABASH RIVER**

# COMPREHENSIVE STU

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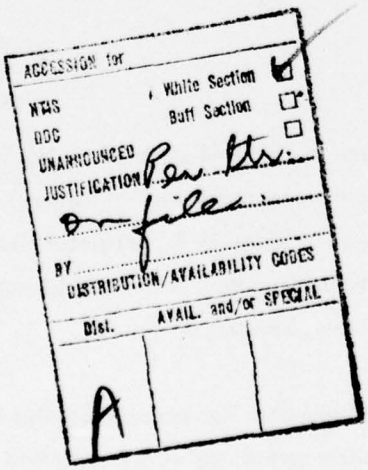
*Appendix - C, Plan Form*

# WABASH RIVER BASIN

# COMPREHENSIVE STUDY

# APPENDIX-C
# PLAN FORMULATION




## WABASH RIVER COORDINATING COMMITTEE

Prepared by the U. S. Army Corps of Engineers

Louisville District

in cooperation with

Member Agencies

of the

Wabash River Coordinating Committee

This study by the Wabash River Coordinating Committee was prepared at field level and presents data for a comprehensive plan for the conservation, management, development and proper preservation of the water and related land resources of the Wabash River Basin. This report is subject to review by the interested Federal agencies at departmental level, by the Governors of the affected States, by the Ohio River Basin Commission, and by the Water Resources Council prior to its transmittal to the Congress for its consideration.

The main report contains the recommendations of the Coordinating Committee. Recommendations that may be included in the appendices are in effect merely suggestions by the author agencies and work groups; these are not to be construed as Coordinating Committee recommendations.

# COMPREHENSIVE BASIN STUDY
# ON
# WABASH RIVER, ILLINOIS, INDIANA AND OHIO

## APPENDIX C

## PLAN FORMULATION

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## SECTION I – INTRODUCTION

### 1. GENERAL INTRODUCTION

The Wabash River Basin Comprehensive Study Coordinating Committee has been working on the study for some eight years. This report is the culmination of those efforts. This appendix – Plan Formulation – like all of the other appendices represents the coordinated and combined efforts of the several States involved along with the Federal agencies. The above is true for this appendix since the Subcommittee (appointed by the Coordinating Committee) which prepared this appendix, was composed of representatives from:

U. S. Department of Agriculture – Soil Conservation Service
U. S. Department of the Army – Louisville District, Corps of Engineers
U. S. Department of Health, Education and Welfare
U. S. Department of Interior – Federal Water Quality Administration
(now the Environmental Protection Agency)
Federal Power Commission
Wabash Valley Interstate Commission
State of Indiana – Department of Natural Resources
State of Ohio – Department of Natural Resources
State of Illinois – Department of Business and Economic Development and the Department of Public Works and Buildings Division of Waterways

The Subcommittee, formed early in 1969, was charged by the Coordinating Committee with putting together a comprehensive and sensible plan for the basin. To aid in this mission five (5) task forces were to furnish information regarding their assigned areas of interest. These task forces were:

Flood Damage Reduction
Water Supply and Water Quality
Recreation, Fish and Wildlife, and Environmental Resources
Regional Development
Land Use

The data generated by the several task forces have provided the basis for this appendix. All information and data used herein is to be found and documented in one of the other appendices. The Plan Formulation Appendix thus serves as the "tie" for all other appendices.

The Plan Formulation Subcommittee held eighteen meetings, of one, two or three days each – to sift, analyze, and correlate information. Most of the meetings were held outside of the immediate environment of any of the participants and quite often lasted well into the night only to be resumed early the next morning. The purpose of such a meeting schedule was to assure that all points of view and all available relevant information was adequately considered. Decisions and conclusions were not agreeable to all but all representatives generally concurred with the conclusion that the formulated plan or approach was the best obtainable at that time.

### 2. PLAN FORMULATION OBJECTIVES

We might define our objective as the United States Senate has in S. D. 97 which states:

"That the objective of water resource planning is to provide the best use or combination of uses of water and related land resources to meet the foreseeable short and long-term needs of the Basin and the Nation."

Or we might define our objectives as the Water Resources Council has in their proposed "Policies and Procedures" which defined the equal priority objectives as:

National Income Efficiency
Regional Development
Preservation and Enhancement of the Environment
Well Being of the Public

We have pursued the objectives listed above but prefer to state our objectives a little differently – with greater emphasis on human and personal values.

Our objective is to develop plans to assure that Mr. and Mrs. United States and family and Mr. and Mrs. Wabash Basin and family have the opportunity to satisfy their basic physical, spiritual and social needs while reducing to the minimum the adverse effects on basic resources and other living peoples and to provide the opportunity for future generations to enjoy more of the good things which we enjoy today.

Thus we are focusing on the physical needs present and future generations as well as the environmental needs. We can do no more.

## 3. PLAN FORMULATION PRINCIPLES AND METHODOLOGY

Early in the plan formulation process we considered developing different plans for Value, Region, Environment and Social Well-being. However, after considerable discussion we decided to develop one plan based on Value (National Income Efficiency) and subject that plan to successive modifications in the interest of: (1) increasing its regional output; (2) minimizing its adverse impact on the environment; (3) providing opportunity for environmental preservation; and (4) promote social well-being. The reason the latter course of action was taken is that we simply did not know how to integrate four mutually-exclusive plans into one comprehensive plan. About this time in recognition of the multiple needs of the Basin, the Subcommittee decided to develop a four element plan which would satisfy to a great extent the objectives listed heretofore. The four elements of the plan are:

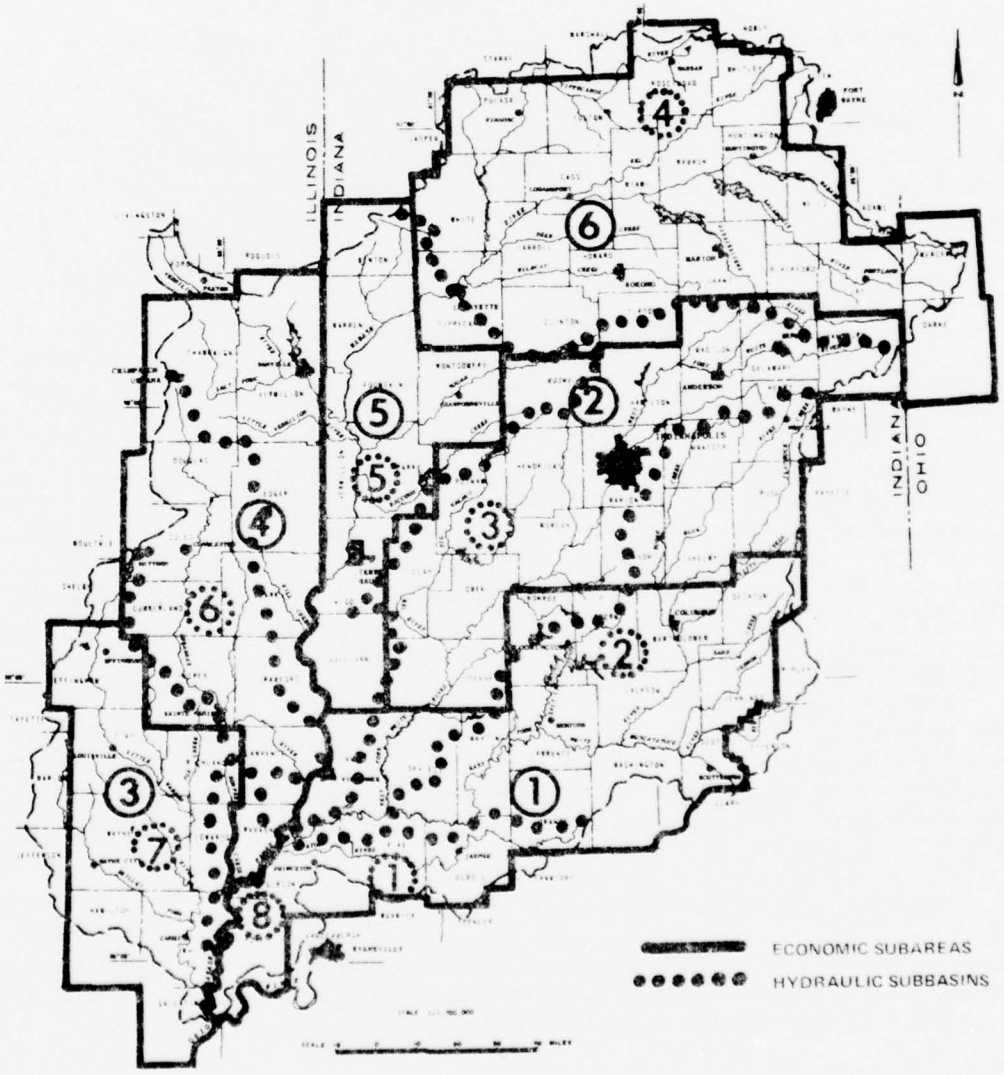
Flood Plain Management
Environmental Corridors
Land Treatment
Structural

In order to separate the Wabash Basin into components which could be better analyzed, two basic divisional criteria were used, namely, 1) drainage areas of major tributaries or parts of the main stream and 2) somewhat similar economic areas with boundaries that followed county lines. There were eight hydrologic subareas used and a brief description of each is given in table C–1.

Since economic statistics were available mostly on the basis of political boundaries another separation was required for projecting demographic, economic, social land use changes and spiritual needs for the future. Accordingly the Basin was divided into six

TABLE C-1. HYDROLOGIC SUBBASIN PERTINENT DATA

| Number | Name | Area (sq mi) | Percent of basin |
|---|---|---|---|
| 1 | Patoka | 862 | 2.6 |
| 2 | East Fork | 5,746 | 17.3 |
| 3 | West Fork | 5,603 | 16.9 |
| 4 | Upper Wabash | 7,267 | 22.0 |
| 5 | Middle Wabash | 6,555 | 19.8 |
| 6 | Embarras | 2,438 | 7.4 |
| 7 | Little Wabash | 3,209 | 9.7 |
| 8 | Lower Wabash | 1,420 | 4.3 |




HYDROLOGIC SUBBASINS AND ECONOMIC SUBAREAS

FIGURE C-1

economic subareas and figure C-1 shows the hydrologic subbasins and the economic subareas and their interrelationship.

The Subcommittee decided to proceed with plan formulation in the following manner:

**WHAT** – determine needs and/or desires. The functional needs were determined as related specifically to environment, flood damage reduction, municipal and industrial water supply, water quality control, irrigation, water for cooling of electrical generating plants, water for rural use, water for preservation of stream environment, recreation needs, fishing needs, hunting needs, and need for preservation and enhancement of features having natural, historical and archeological significance.

**WHAT** – determine the alternative means for meeting the indicated needs and cost out the most relevant of these alternatives.

**WHICH** – select that alternative or combinations of alternatives that will most efficiently satisfy the needs irrespective of environmental, regional or social well-being considerations. These latter considerations were to be fully considered and included later. In selecting the most efficient alternative means of satisfying needs, strict adherence was accorded to sound economic principles.

**WHO** – after selection of tentative plans, determine which agency or groups of agencies could best be responsible for carrying out the plans or plan elements. This was the first time that an agency label was applied to any part of the plan.

**WHEN** – program the development so that problems could be solved and needs would be met in a timely manner and priorities set for development consistent with reasonable budgets.

There have been two basic principles which have guided us throughout the plan formulation process.

### a. Retain Options

This principle has provided a basis for assuring that early action did not preclude later action which might be needed more than the justifiable early action. This principle aided us at times of indecision when the question would be asked "Which of the available sources of action will minimally preclude future action, since the future is hazy and somewhat difficult to determine."

### b. Here and Now vs. There and Then

Many of the problems which we analyzed needed to be solved here and now and not there and then. However in determining solutions to the problems here and now we exercised caution that we are not creating additional problems for the there and then.

## 4. BASIC ASSUMPTIONS IN PLAN FORMULATION

**a.** That we would develop an Early Action Plan directed toward meeting the needs of the 1980 time frame.

**b.** That another plan – Long Range Plan – would be developed which would meet the needs of the 2020 time frame. The elements of the Early Action Plan are a part of the Long Range Plan. Although the implementation of some of the Long Range Plan elements is not firm, the Long Range Plan was formulated as an eventual plan and not an add-on to the Early Action Plan.

**c.** That institutional arrangement would not be responsive enough to effect flood plain management by 1980 but by 2020 could and should be able to have a significant impact on future development within the flood plain.

**d.** That where channel improvements were considered, specific and priority consideration were accorded to measures that would minimize alteration of the stream environment. Such considerations would protect stream fisheries and stream bank wildlife habitat.

**e.** That where streamflow (rather than storage) is used for municipal and industrial water supply, the streams capability would be based on the low flow that is likely to occur for any one (1) day in each 30 years.

**f.** That where storage is considered for municipal and industrial water supply the storage should be provided to meet the projected demands for 49 out of 50 years. This is equivalent to a 98% confidence factor. There is no such thing as a 100% confidence factor since there always may be a future drought more severe than those recorded.

**g.** That where stream flow (rather than storage) is used for water quality control, the stream capability would be based on the low flow that is likely to occur for seven (7) days once in each 10 years.

**h.** That where storage is provided for augmentation of low stream flows in the interest of water quality control the storage should be provided to meet the projected demands for 9 out of 10 years. This is equivalent to a 90% confidence factor.

**i.** That where storage is provided to meet downstream fishery needs, the storage should be provided to meet the projected needs for 19 out of 20 years. This is equivalent to a 95% confidence factor.

**j.** That no storage is to be provided for navigation since navigation considerations are a matter of another study and beyond the purview of plan formulation for the current Wabash Comprehensive Study. After plan formulation is complete and the plan is selected the impact that potential navigation on the Wabash might have on the plan could be assessed.

**k.** That the established intra- and inter-state water quality standards be used and all considerations be consistent with these standards and all plans be directed toward meeting these standards.

**l.** That the necessity of reducing air pollution is recognized but that development of programs for such accomplishment is beyond the scope of this study. However, programs resulting from this study should be directed toward minimizing air poilution.

**m.** That the proper disposal of solid refuse is of great concern but is beyond the scope of this study.

**n.** That the price level base for costs, annual charges, discount factors and projections is that which prevailed on 31 December 1968.

**o.** That an annual interest rate of 4 and 7/8 percent be used in determining the efficiency of all alternatives.

**p.** That where all needs cannot be met that priority for meeting needs would be in the following order.

1. Municipal and industrial water supply (includes farm use exclusive of irrigation.)

2. Water quality control

3. All other needs.

## SECTION II – DETERMINATION OF GROSS NEEDS

### 5. GENERAL INTRODUCTION

The present and projected public need for the products of the water and related land resources are quite varied – ranging from structural developments through better management of our resources to the definite need (if not demand) that some of our stream environments be left unaltered from their present conditions. In developing the needs the basic parameters for future needs are population changes and anticipated activities of the projected population. Thus we should first take stock of the demographic projections for each of the economic subareas and then determine what existing and projected population level and endeavor would demand of water and related land resources. These data indicated that there would be a continuing urbanization of the basin; more land being converted from farm use to urban uses; and more land being converted from a land environment into a water environment. Thus the quantity of people and their necessary activities have formed the basis for all projections. The number of people (quantity of life) is one of the two most important facets of the basic considerations. The other most important aspect is the necessity to assure the spiritual, economic and social well-being (quality of living) of whatever population level prevails within the Wabash Basin. Thus we are trying to place the Quantity of Life in balance with the Quality of Living.

Although we recognize the absolute necessity of minimizing or stopping population growth at some level we have not attempted to place a limit on what population level the basin can sustain. The Plan Formulation Subcommittee felt inadequate to do so, since the population level sustainable by the Basin's resources reflects to a great extent the accumulative value standards of the populace and as such these value standards are based on the environment in which we have developed and the value standards have changed and will continue to change as our environment changes. Who could have foreseen the changes in our value standards that accompanied the great urbanization migration that began in the 1940's and has continued until the present? Who could have foretold that our country's population would grow from about 132 million in 1940 to 205 million in 1970 with really so little traumatic social effect? This traumatic effect would have no doubt been considerably greater if this population increase had not been accompanied or accommodated by corresponding changes in value standards. However we conclude that there is a real and absolute limit to the number of people that can live in the basin in a quality manner – it is simply that we do not know how to establish that number in the Wabash without being furnished a comparable number for the Nation and the Ohio River basin. We are convinced on the other hand that the projected population for the year 2020 can be sustained in the basin in a quality manner since the projected population density of 200 per square mile is exceeded many times over in other countries and states today with an apparent minimum of severe adverse effects.

### 6. MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS

The needs for water supply are expected to grow at a faster rate than the population since the per capita use for water is growing and this growth is expected to continue with somewhat of a muted growth in the latter years of the planning period. There are many communities mentioned in Appendix F which will need to expand their existing water supply capability to meet future demands. Many of these communities can expand or enlarge their existing sources and systems without requiring additional external (to their existing source) sources of supply. Accordingly these communities were not considered in great detail in Plan Formulation studies since Plan Formulation was related primarily to areas having external requirements. A summary listing of the communities for which Plan Formulation was effected, their existing supply and their development needs are shown in tables C–2 and C–9.

TABLE C– 2. SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
PATOKA SUBBASIN

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Jasper | | 3.0 | 3.2 | 0.2 | 8.2 | 5.2 |
| Huntingburg | | 1.1 | 1.2 | | 2.9 | 1.8 |
| Ferdinand | | 0.16 | 0.17 | 0.01 | 0.46 | 0.30 |
| Pike County | 0.07 | | 0.13 | 0.06 | 0.31 | 0.24 |
| Oakland City | | 0.64 | 0.50 | 0.00 | 1.41 | 0.77 |
| Princeton | 2.0 | | 2.2 | 0.2 | 6.0 | 4.0 |
| *Remainder of Gibson Co.* | *0.19* | | *0.18* | *0.00* | *0.48* | *0.29* |

TABLE C– 3. SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
EAST FORK WHITE SUBBASIN

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| New Castle | 6.8 | | 6.2 | | 16.9 | 10.1 |
| Knightstown | 1.2 | | 0.4 | | 1.0 | --- |
| Other-Henry Co.[1/] | 1.1 | | 0.3 | | 0.9 | --- |
| Carthage | 0.5 | 9.0 | 5.1 | --- | 8.7 | --- |
| Rushville | 2.7 | | 0.9 | | 2.5 | |
| Other-Rush Co.[1/] | 0.5 | | 0.2 | | 0.2 | --- |
| Morristown | 0.5 | | 0.4 | | 1.3 | 0.8 |
| Shelbyville | 4.7 | | 3.8 | | 10.2 | 5.5 |
| Greenfield | 2.9 | | 2.6 | | 9.1 | 6.2 |
| Edinburg | 3.5 | | 2.1 | | 5.8 | 2.3 |
| Whiteland-New Whiteland | 0.9 | | 1.0 | 0.1 | 2.4 | 1.5 |
| Franklin | 3.1 | | 2.4 | | 7.4 | 4.3 |
| Other-Johnson Co.[1/] | 0.5 | 0.5 | 0.8 | | 1.2 | 0.2 |
| Columbus | 6.3 | | 12.4 | 6.1 | 37.0 | 30.7 |
| Hope | 0.5 | | 0.4 | | 1.2 | 0.7 |
| Other-Bartholomew Co.[1/] | 0.2 | | 0.2 | | 0.2 | --- |
| Greensburg | 0.9 | 1.1 | 1.6 | --- | 4.6 | 2.6 |
| Other-Decatur Co.[1/] | 0.3 | | 0.3 | | 0.7 | 0.4 |
| Brownstown | 0.4 | 5.9 | 1.6 | --- | 4.9 | --- |
| Medora | 0.8 | | 0.3 | | 0.8 | |
| Seymour | | 15.7 | 3.9 | | 13.1 | |
| Crothersville | 0.6 | | 0.3 | | 1.0 | 0.4 |
| Scottsburg | | 0.6 | 1.0 | 0.4 | 1.9 | 1.3 |
| Austin | | 2/ | 2.6 | 2.6 | 5.3 | 5.3 |

TABLE C– 3 . SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
EAST FORK WHITE SUBBASIN (CONTINUED)

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Vernon-N. Vernon | | 2.6 | 1.4 | | 4.6 | 2.0 |
| Other-Jennings Co.[1/] | | 0.6 | 0.5 | | 0.5 | |
| Nashville | | 1.0 | 0.4 | | 1.6 | 0.6 |
| Other-Brown Co.[1/] | | 0.5 | 0.6 | 0.1 | 2.1 | 1.6 |
| Bedford | | 19.0 | 5.2 | | 15.8 | |
| Mitchell | | 2.9 | 0.9 | | 2.4 | |
| Other-Lawrence Co.[1/] | | 0.80 | 1.7 | 0.9 | 2.0 | 1.2 |
| Bloomington | | 24.0 | 14.5 | | 38.7 | 14.7 |
| Other-Monroe Co.[1/] | | 1.3 | 1.8 | 0.5 | 3.6 | 2.3 |
| Loogootee | 0.8 | | 0.8 | 0.0 | 3.7 | 2.9 |
| Shoals | 0.3 | | 0.3 | 0.0 | 1.3 | 1.0 |
| Other - Martin Co. [1/] | 0.2 | | 0.4 | 0.2 | 1.0 | 0.8 |
| Washington Co. | 0.1 | | 0.1 | | 0.3 | 0.2 |
| Orleans | 0.5 | | 0.3 | | 0.8 | 0.3 |
| Paoli | | 0.3 | 0.7 | 0.4 | 2.2 | 1.9 |
| W. Baden-French Lick | | [2/] | 0.7 | 0.7 | 1.6 | 1.6 |

[1/] Other small municipal, industrial or institutional demands in the East Fork White River subbasin drainage of the indicated county.

[2/] Surface water supply in use; firm yield questionable but small and taken as zero for purposes of this study.

TABLE C– 4 . SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
WEST FORK WHITE SUBBASIN

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Winchester | 1.4 | | 2.0 | 0.6 | 6.7 | 5.3 |
| Other-Randolph Co. | 0.6 | | 0.3 | | 0.7 | 0.1 |
| Mt. Summit | 1.0 | | 1.2 | 0.2 | 1.8 | 0.8 |
| Middletown | 0.3 | | 0.3 | | 0.8 | 0.5 |
| Muncie | 5.0 | 13.8 | 21.6 | 2.8 | 58.0 | 39.2 |
| Fortville | 1.0 | | 0.5 | | 1.3 | 0.3 |
| Other-Hancock Co. | 0.4 | | 0.2 | | 0.3 | |
| Chesterfield | 0.5 | | 0.4 | | 0.9 | 0.4 |
| Anderson | 16.3 | 18.1 | 24.0 | | 55.7 | 21.3 |
| Edgewood | 1.0 | | 0.4 | | 0.8 | |
| Alexandria | 1.6 | | 1.9 | 0.3 | 4.9 | 3.3 |
| Summitville | 0.8 | | 0.4 | | 0.9 | 0.1 |
| Orestes | 0.4 | | 0.4 | | 1.0 | 0.6 |

TABLE C– 4 . SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS WEST FORK WHITE SUBBASIN (CONTINUED)

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Frankton | 0.2 | | 0.2 | | 0.5 | 0.3 |
| Elwood | 3.2 | | 3.5 | 0.3 | 8.0 | 4.8 |
| Lapel | 0.4 | | 0.3 | | 0.7 | 0.3 |
| Pendleton | 1.6 | | 0.4 | | 0.9 | |
| Pendleton Reformatory | | 1.0 | 0.8 | | 0.8 | |
| Tipton | 1.8 | | 1.2 | | 2.6 | 0.8 |
| Other-Tipton Co. | 0.1 | 0.1 | 0.2 | 0.6 | 0.7 | 0.7 |
| Noblesville | 3.6 | | 2.5 | | 4.2 | 0.6 |
| Cicero | 0.3 | | 0.2 | | 0.5 | 0.2 |
| Westfield | 0.2 | | 0.2 | | 0.5 | 0.3 |
| Other-Hamilton Co. | 0.8 | | 0.4 | | 0.9 | 0.1 |
| Indianapolis | 40.0 | 120 | 174.0 | 14.0 | 360.0 | 200.0 |
| Other-Johnson Co. | 0.4 | | 0.2 | | 0.3 | |
| Other-Boone Co. | 0.3 | | 0.1 | | 0.4 | 0.1 |
| Brownsburg | 1.1 | | 0.7 | | 3.1 | 2.0 |
| Pittsboro | 0.4 | | 0.2 | | 0.6 | 0.2 |
| Plainfield | 1.7 | | 1.0 | | 4.0 | 2.3 |
| Danville | 2.0 | | 0.6 | | 2.2 | 0.2 |
| Other-Hendricks Co. | 1.7 | | 0.2 | | 0.4 | |
| Mooresville | 1.0 | | 0.6 | | 1.5 | 0.5 |
| Martinsville | 1.3 | | 1.0 | | 4.0 | 2.7 |
| Other-Morgan Co. | 0.8 | | 0.2 | | 0.8 | |
| Other-Monroe Co. | | 41.2 | 0.4 | | 1.0 | |
| Industries-Monroe Co. | | 0.4 | 0.6 | 0.2 | 1.2 | 0.8 |
| Greencastle | 6.2 | | 4.7 | | 15.0 | 8.8 |
| Putnamville State Farm | | 0.2 | 0.7 | 0.5 | 1.2 | 1.0 |
| Other-Putnam Co. | 0.2 | | 0.2 | | 0.4 | 0.2 |
| Brazil | 3.0 | | 1.9 | | 6.1 | 3.1 |
| Other-Clay Co. | 0.4 | | 0.2 | | 0.5 | 0.1 |
| Spencer | 1.0 | | 0.2 | | 0.6 | |
| Other-Owen Co. | 0.2 | | 0.03 | | 0.1 | |
| Jasonville (Hymeria) | 0.6 | | 0.3 | | 1.0 | 0.4 |
| Bloomfield | 0.8 | | 0.3 | | 0.6 | |
| Linton (Dugger) | 1.5 | | 0.9 | | 2.3 | 0.8 |
| Other-Greene Co. | 1.2 | | 0.5 | | 0.9 | |
| Crane Naval Depot | | 1.0 | 1.0 | | 1.0 | |
| Odon | 0.3 | | 0.4 | 0.1 | 0.8 | 0.5 |
| Washington | 4.0 | | 2.4 | | 5.8 | 1.8 |
| Other-Daviess Co. | 0.4 | | 0.2 | | 0.6 | 0.2 |
| Bicknell | 1.2 | | 0.6 | | 1.6 | 0.4 |
| Other-Knox Co. | 1.9 | | 0.3 | | 0.8 | |
| Petersburg | | 1.3 | 0.3 | | 1.1 | |
| Other-Gibson Co. | 0.1 | | 0.1 | | 0.1 | |

TABLE C– 5. SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
UPPER WABASH SUBBASIN

| Area of need | Existing supply (mgd) | | Existing daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Ft. Recovery, Ohio | 0.75 | | 0.23 | | 0.59 | |
| St. Henry, Ohio | 0.70 | | 0.42 | | 1.10 | 0.4 |
| Coldwater, Ohio | 1.20 | | 0.80 | | 1.20 | |
| Celina, Ohio | | 5.9 | 1.80 | | 4.90 | |
| Adams Co. | 0.77 | | 0.34 | | 0.56 | |
| Warren | 1.0 | | 0.29 | | 0.50 | |
| Roanoke | 0.37 | | 0.26 | | 0.50 | 0.13 |
| Huntington | 2.50 | 12.9 | 4.7 | | 19.1 | 3.7 |
| Andrews | 0.50 | | 0.32 | | 0.55 | 0.05 |
| Other-Huntington Co. | 1.44 | | 0.44 | | 0.65 | |
| Bluffton | 2.4 | 2.6 | 2.5 | | 6.2 | 1.2 |
| Other-Wells Co. | 0.55 | | 0.17 | | 0.41 | |
| Portland | 2.7 | | 3.2 | .05 | 7.5 | 4.8 |
| Redkey | 0.51 | | 0.33 | | 0.80 | |
| Dunkirk | 0.90 | | 0.90 | | 2.30 | 1.4 |
| Other-Jay Co. | 0.38 | | 0.04 | | 0.10 | |
| Union City | 2.6 | | 1.4 | | 6.0 | 3.4 |
| Saratoga | 0.37 | | 0.7 | 0.33 | 1.7 | 1.3 |
| Other-Randolph Co. | 0.33 | | 0.11 | | 0.28 | |
| Albany | 0.50 | | 0.36 | | 0.73 | 0.23 |
| Eaton | 0.36 | | 0.30 | | 0.58 | 0.22 |
| Montpelier | | 1.3 | 0.40 | | 1.2 | |
| Hartford City | 3.0 | | 4.5 | 1.5 | 12.4 | 9.4 |
| Upland | 0.79 | | 0.25 | | 0.77 | |
| Fowlerton | 0.20 | | 0.22 | 0.02 | 0.57 | 0.37 |
| Gas City | 0.90 | | 1.5 | 0.6 | 3.7 | 2.8 |
| Fairmount | 1.9 | | 0.6 | | 1.4 | |
| Jonesboro | 0.7 | | 0.5 | | 1.2 | 0.5 |
| Marion | 22.5 | | 13.5 | | 36.6 | 13.5 |
| Swayzee | 0.9 | | 0.45 | | 1.5 | 0.6 |
| Point Isabel | 0.2 | | 0.31 | 0.11 | 1.3 | 1.1 |
| Other-Grant Co. | .58 | | 0.49 | | 0.86 | 0.26 |
| Lagro | 0.5 | | 0.70 | 0.2 | 1.5 | 1.0 |
| Wabash | 7.1 | | 5.7 | | 15.1 | 8.0 |
| North Manchester | 2.1 | | 1.4 | | 2.6 | 0.5 |
| Other-Wabash Co. | 2.43 | | 0.48 | | 0.91 | |
| Pierceton | 0.80 | | 0.24 | | 0.65 | |
| Warsaw | 3.2 | 2.0 | 4.6 | | 11.8 | 6.6 |
| Mentone | 0.7 | | 0.25 | | 0.71 | 0.01 |
| Other-Kosciusko Co. | 2.18 | | 0.51 | | 1.07 | |
| Churubusco | 0.6 | | 0.20 | | 1.1 | 0.5 |
| Columbia City | 1.6 | | 1.20 | | 4.0 | 2.4 |
| South Whitley | 1.2 | | 0.60 | | 2.0 | 0.8 |
| Culver | 0.67 | | 0.39 | | 0.50 | |
| Other-Marshall Co. | 0.43 | | 0.18 | | 0.38 | |

TABLE C– 5 . SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS UPPER WABASH SUBBASIN (CONTINUED)

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Peru | 4.5 | 38.7 | 3.3 | | 8.8 | 4.3 |
| Converse | 1.0 | | 0.70 | | 1.0 | |
| Grissom AFB | 1.2 | | 1.0 | | 1.0 | |
| Other-Miami Co. | 0.32 | | 0.09 | | 0.23 | |
| Akron | 0.34 | | 0.20 | | 0.80 | 0.46 |
| Rochester | 3.10 | | 1.30 | | 3.80 | 0.7 |
| Other-Fulton Co. | 0.21 | | 0.13 | | 0.36 | 0.15 |
| Winamac | 1.0 | | 0.67 | | 3.3 | 2.3 |
| Other-Pulaski Co. | 0.88 | | 0.28 | | 0.58 | |
| Logansport | | 38.7 | 5.3 | | 10.9 | |
| Galveston | 0.66 | | 0.34 | | 0.8 | 0.14 |
| Other-Cass Co. | 1.18 | | 0.51 | | 0.76 | |
| Greentown | 0.14 | | 0.32 | 0.18 | 0.54 | 0.40 |
| Kokomo | 4.5 | 8.0 | 33.1 | 20.6 | 84.8 | 72.3 |
| Other-Howard Co. | None | | | | | |
| Tipton Co. | 0.40 | | 0.16 | | 0.42 | 0.02 |
| Frankfort | 8.5 | | 3.9 | | 9.4 | 0.9 |
| Other-Clinton Co. | 0.42 | | 0.31 | | 0.58 | 0.16 |
| Flora | 1.2 | | 0.42 | | 1.4 | 0.2 |
| Delphi | 2.3 | | 0.66 | | 2.4 | 0.1 |
| Other-Carroll Co. | 0.71 | | 0.10 | | 0.34 | |
| Monticello | 2.0 | | 1.4 | | 3.1 | 1.1 |
| Monon | 0.50 | | 0.27 | | 0.68 | 0.18 |
| Other-White Co. | 0.88 | 0.20 | 0.48 | | 1.18 | 0.1 |
| Lafayette Area | 43.5 | | 32.8 | | 85.1 | 41.6 |
| Other-Tippecanoe Co. | 1.03 | | 0.42 | | 0.69 | |

TABLE C– 6 . SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS MIDDLE WABASH SUBBASIN

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| INDIANA | | | | | | |
| Other-Clinton Co. | 0.75 | | 0.23 | | 0.43 | |
| Lebanon | 3.0 | | 0.90 | | 3.4 | 0.4 |
| Other-Boone Co. | 0.34 | | 0.17 | | 0.54 | 0.20 |
| Fowler | 1.6 | | 0.62 | | 2.2 | 0.60 |

TABLE C – 6. SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
MIDDLE WABASH SUBBASIN (CONTINUED)

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Other-Benton Co. | 1.47 | | 0.46 | | 1.17 | |
| Rural Warren Co. Industry | 3.8 | | 7.4 | 3.6 | 34.8 | 31.0 |
| Williamsport | 0.86 | | 0.27 | | 0.62 | |
| Other-Warren Co. | 0.08 | | 0.16 | 0.08 | 0.38 | 0.30 |
| Veedersburg | 0.72 | | 0.38 | | 0.69 | |
| Covington | 0.86 | | 0.43 | | 0.76 | |
| Attica | 2.4 | | 2.5 | 0.1 | 5.2 | 2.8 |
| Other-Fountain Co. | 0.21 | | 0.16 | | 0.27 | 0.06 |
| Crawfordsville | 3.00 | | 5.5 | 2.5 | 18.3 | 15.3 |
| Other-Montgomery Co. | 2.52 | | 0.68 | | 1.35 | |
| Other-Putnam Co. | 0.38 | | 0.26 | | 0.40 | 0.02 |
| Montezuma | 1.2 | | 0.17 | | 0.51 | |
| Rockville | 1.4 | | 0.57 | | 1.8 | 0.04 |
| Other-Parke Co. | 0.59 | | 0.40 | | 1.19 | 0.60 |
| Clinton | 1.5 | | 0.65 | | 1.2 | |
| Rural Vermillion Co. Industry | 11.5 | | 4.1 | | 31.6 | 20.1 |
| Other-Vermillion Co. | 1.95 | | 0.41 | | 0.70 | |
| Terre Haute | 30.8 | | 43.0 | 12.2 | 126.5 | 95.7 |
| Sullivan | 1.4 | | 1.0 | | 2.1 | 0.7 |
| Other-Sullivan Co. | 0.17 | | 0.10 | | 0.26 | 0.09 |
| Vincennes | 9.1 | | 8.3 | | 22.4 | 13.3 |
| Other-Knox Co. | 0.30 | | 0.18 | | 0.42 | 0.12 |
| ILLINOIS | | | | | | |
| Paxton | 1.6 | | 0.80 | | 1.4 | 0.10 |
| Other-Ford Co. | 0.37 | | 0.09 | | 0.19 | |
| Hoopeston | 2.9 | | 3.5 | 0.60 | 7.1 | 4.2 |
| Rossville | 1.0 | | 0.80 | | 1.4 | 0.40 |
| Danville | 3.0 | 5.0 | 16.4 | 8.4 | 43.8 | 35.8 |
| Georgetown | | 1.0 | 1.1 | 0.1 | 2.5 | 1.5 |
| Other-Vermilion Co. | 1.56 | 0.36 | 0.59 | | 1.03 | |
| Rantoul | 2.0 | | 1.7 | | 3.2 | 1.2 |
| Chanute Field | 2.0 | | 1.7 | | 1.7 | |
| Champaign | 23.0 | | 16.0 | | 32.5 | 9.5 |
| Other-Champaign Co. | 1.3 | | 0.77 | | 1.52 | 0.22 |
| Paris | 0.1 | 0.8 | 2.4 | 1.5 | 7.3 | 6.4 |
| Other-Edgar Co. | 0.54 | | 0.24 | | 0.42 | |
| Marshall | 2.7 | | 2.0 | | 7.2 | 4.5 |
| Other-Clark Co. | | | None | | | |
| Robinson | 3.3 | | 5.4 | 2.1 | 12.7 | 9.4 |
| Other-Crawford Co. | 0.73 | | 0.26 | | 0.40 | |
| Other-Lawrence Co. | 0.06 | | 0.16 | 0.10 | 0.25 | 0.19 |
| Other-Wabash Co. | 0.05 | | 0.07 | 0.02 | 0.15 | 0.10 |

TABLE C– 7. SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
EMBARRAS SUBBASIN

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Champaign Co. | 0.83 | | 0.45 | | 0.95 | 0.12 |
| Edgar Co. | 0.47 | | 0.19 | | 0.39 | |
| Tuscola | 0.46 | | 0.46 | | 1.25 | 0.79 |
| Arcola | 0.23 | | 0.42 | 0.19 | 1.50 | 1.27 |
| Villa Grove | 0.33 | | 0.25 | | 0.60 | 0.27 |
| Other-Douglas Co. | 0.31 | | 0.12 | | 0.32 | 0.01 |
| Charleston | | 0.65 | 2.2 | 1.55 | 4.4 | 3.75 |
| Other-Coles Co. | 0.15 | 0.25 | 0.19 | | 0.38 | |
| Casey | 0.44 | | 0.35 | | 1.00 | 0.56 |
| Other-Clark Co. | 0.32 | | 0.18 | | 0.43 | 0.11 |
| Cumberland Co. | 0.72 | | 0.30 | | 0.63 | |
| Crawford Co. | 0.24 | | 0.04 | | 0.06 | |
| Newton | 0.54 | 0.73 | 0.53 | | 1.55 | 0.28 |
| Other-Jasper Co. | 0.09 | | 0.05 | | 0.14 | 0.05 |
| Lawrenceville | 1.70 | 7.60 | 8.18 | | 8.70 | 0.40 |

TABLE C– 8. SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
LITTLE WABASH SUBBASIN

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Mattoon | | 4.35 | 2.9 | | 8.1 | 3.8 |
| Cumberland | | 0.33 | 0.09 | | 0.30 | |
| Shelby Co. | 0.11 | | 0.04 | | 0.08 | |
| Effingham | | 6.3 | 2.0 | | 5.1 | |
| Altamont | | 0.10 | 0.30 | 0.20 | 0.70 | 0.60 |
| Edgewood (Mason) | 0.06 | | 0.07 | 0.01 | 0.18 | 0.12 |
| Deterich | 0.05 | | 0.06 | 0.01 | 0.16 | 0.11 |
| Other-Effingham Co. | 0.20 | | 0.14 | | 0.33 | |
| Flora | | 0.70 | 1.0 | 0.30 | 3.7 | 3.0 |
| Louisville | | 0.03 | 0.13 | 0.10 | 0.42 | 0.39 |
| Clay City | | 0.09 | 0.15 | 0.06 | 0.51 | 0.42 |
| Marion Co. | 0.07 | | 0.02 | | 0.04 | |
| Olney | | 3.6 | 1.94 | | 6.02 | 2.4 |
| Other-Richland Co. | 0.32 | | 0.10 | | 0.20 | |
| Albion | 0.43 | | 0.33 | | 1.3 | |
| Fairfield | | 2.23 | 1.34 | | 5.11 | 2.9 |
| Cisne | 0.07 | | 0.08 | 0.1 | 0.16 | 0.9 |

TABLE C– 8. SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
LITTLE WABASH SUBBASIN (CONTINUED)

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| Other-Wayne Co. | 0.06 | 1.39 | 0.16 | | 0.42 | |
| Carmi | | 8.70 | 1.24 | | 2.77 | |
| Enfield | 0.12 | | 0.08 | | 0.16 | 0.04 |
| Other-White Co. | 0.26 | | 0.16 | | 0.34 | |
| Gallintin Co. | 0.14 | | 0.07 | | 0.20 | |

TABLE C– 9. SUMMARY OF MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS
LOWER WABASH SUBBASIN

| Area of need | Existing supply (mgd) | | Average daily needs (mgd) | | | |
|---|---|---|---|---|---|---|
| | | | 1980 | | 2020 | |
| | Ground water | Surface water | Gross | Net additional | Gross | Net additional |
| INDIANA | | | | | | |
| NO DEFICIENT AREAS | | | | | | |
| ILLINOIS | | | | | | |
| Mt. Carmel | | 10.0 | 2.46 | | 7.62 | |
| Other-Wabash Co. | 0.10 | | 0.12 | 0.02 | 0.24 | 0.14 |
| Other-Richland Co. | 0.03 | | 0.02 | | 0.04 | 0.01 |
| West Salem | | 0.10 | 0.10 | | 0.28 | 0.18 |
| Grayville | 0.72 | | 0.53 | | 1.48 | 0.76 |

## 7. WATER QUALITY CONTROL NEEDS

Water quality needs are defined as those improvements necessary to meet the inter- and intra-state stream standards which were established by the States of Indiana, Illinois and Ohio, and approved by the Secretary of Interior (now the responsibility of the Administrator of the Environmental Protection Agency.) The effluent wastewaters from many communities would be harmonious with the standards if their existing treatment plants were improved or if secondary treatment plants with effluent disinfection facilities were constructed. These communities have not been considered in Plan Formulation studies since Plan Formulation was directed toward those additional measures required to meet stream standards after adequate treatment at the source. Adequate treatment at the source was concluded to mean secondary treatment plus disinfection of the effluent. Those communities for which additional measures are required in order that their effluents will not violate stream standards are listed in tables C–10 to C-16.

## 8. FLOOD DAMAGE REDUCTION NEEDS

Flood control reduction needs are predicated on reducing annual flood damages to urban endeavors, agricultural pursuits, transportation facilities and to the social and economic disruptions caused by floodwater overflows. It is somewhat ironic that flooding adversely affects most that segment of the population least able to sustain losses – the economically deprived including many black Americans in the urban areas and the small farmer who, in order to make a living, has no alternative but to extract the greatest income he can from the land he has. Tables C–17 through C–24 provide a summary of the present and projected future flood damages for various streams and reaches in each of the hydrologic subbasins. *Table C–25 is a condensed version* of these tables. Data in these tables were extracted from Appendix D.

## 9. RECREATION NEEDS

Recreation needs are predicated on the desires of the populace, the leisure time they have, the affluence they exhibit and their cumulative value standards. It is most difficult to separate recreation demands from desires. It is concluded however, that in order to maintain a reasonable level of social and domestic tranquility, a certain amount of recreational opportunity and use be available. This unknown amount is without question a demand. Any amount in excess of this demand is more of a desire. Thus, we may conclude that recreation needs are comprised of two components namely demand and desire. We readily confess that we do not know how to quantify each of the two components. However, we can quantify the sum of the two components. This has been done (as explained in Appendix I) by projecting the needs for six water associated activities.

We have confined our activities to those that relate to needs for water associated activities since the ability to meet these needs as far as this study is concerned are basically confined to water associated activities. We cannot and should not attempt to supply the full spectrum of recreational opportunities since a great portion of the opportunities must be met by local institutions such as City and County Park Boards, private enterprise and state park organizations. Accordingly, the recreation needs as considered herein are those beyond what can reasonably be met by other institutions and are related to those types of activities which have traditionally been provided by a combined local state-federal institutional program. It is recognized that there is an exchange of recreation need between the basin and external areas, i.e., some residents of the basin will participate or desire to participate in recreational experiences outside of the basin while many residents outside of the basin will participate in the basin. We conclude that this will about balance out since there is no hard evidence to the contrary. A summary of the recreation needs by economic subarea is depicted in table C–26.

TABLE C–10. SUMMARY OF WATER QUALITY CONTROL NEEDS
PATOKA SUBBASIN

| Identification of point of need[1/] | Existing supply 7-day, 1 in 10 low flow, cfs | 1980 | | 2020 | |
|---|---|---|---|---|---|
| | | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need |
| Jasper | 0 | 25 | 97 | 78 | 97 |
| Huntingburg | 0 | 7.8 | 97 | 18 | 97 |
| Princeton | 0.3 | 20 | 97 | 52 | 97 |

1/ Upstream from effluent

2/ Based on 90% treatment efficiency.

TABLE C–11. SUMMARY OF WATER QUALITY CONTROL NEEDS
EAST FORK WHITE SUBBASIN

| Identification of point of need[1/] | Existing supply 7-day, 1 in 10 low flow, cfs | 1980 | | 2020 | |
|---|---|---|---|---|---|
| | | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need |
| New Castle | 3.1 | 19 | 97 | 78 | 97 |
| Greenfield | 0 | 15 | 97 | 34 | 97 |
| Shelbyville Area | 34.0 | 36 | 90 | 108 | 95 |
| Whiteland-New Whiteland | 0 | 2.8 | 95 | 7.4 | 95 |
| Franklin | Nil | 13 | 97 | 40 | 97 |
| Rushville | 2.0 | 6.3 | 95 | 14 | 97 |
| Columbia | 100.0 | 77 | 90 | 225 | 95 |
| Greensburg | 0 | 4.1 | 97 | 12 | 97 |
| Mitchell | 0 | 2.3 | 95 | 6.0 | 95 |
| Bloomington | 0 | 30 | 97 | 52 | 97 |
| Vernon-North Vernon | 0 | 3.5 | 95 | 14 | 97 |
| Austin-Scottsburg | 0 | 30 | 97 | 55 | 97 |
| Paoli | 0 | 1.7 | 95 | 5.5 | 95 |
| West Baden-French Lick | Nil | 1.9 | 95 | 3.8 | 95 |
| Loogootee | 0 | 5.3 | 97 | 18 | 97 |

1/ Upstream from effluent

2/ Based on 90% treatment efficiency

TABLE C– 12. SUMMARY OF WATER QUALITY CONTROL NEEDS
WEST FORK WHITE SUBBASIN

| Identification of point of need[1/] | Existing supply 7-day, 1 in 10 low flow, cfs | 1980 | | 2020 | |
|---|---|---|---|---|---|
| | | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need |
| Winchester | 0.2 | 7.0 | 97 | 17 | 97 |
| Muncie | 1.6 | 200.0 | 98 | 510 | 98 |
| Anderson | 36.0 | 185.0 | 98 | 480 | 98 |
| Alexandria | 2.0 | 5.7 | 95 | 16 | 97 |
| Elwood | 0.2 | 11.0 | 97 | 34 | 97 |
| Tipton | 0.3 | 3.6 | 97 | 6.6 | 97 |
| Pendleton | 8.0 | 8.0 | 90 | 12 | 95 |
| Indianapolis | 44.0 | 2,150.0 | 97 | 3,950 | 97 |
| Brownsburg | 0 | 3.0 | 97 | 11 | 97 |
| Plainfield | 1.0 | 4.9 | 97 | 16 | 97 |
| Danville | 0 | 2.3 | 97 | 9 | 97 |
| Mooresville | 2.0 | 2.6 | 95 | 7.6 | 95 |
| Greencastle | 2.5 | 11.0 | 95 | 19 | 95 |
| Brazil | 0 | 5.3 | 97 | 11 | 97 |
| Linton | 0 | 5.6 | 97 | 13 | 97 |
| Bicknell | 0 | 3/ | 3/ | 3/ | 3/ |
| Washington | 0 | 3/ | 3/ | 3/ | 3/ |
| Petersburg | 0 | 3/ | 3/ | 3/ | 3/ |
| Bloomington (Plant No 2) | 0 | 21.0 | 97 | 55 | 97 |

1/ Upstream from effluent

2/ Based on 90% treatment efficiency

3/ Not estimated. Indicated solution is transport of waste waters of White River following adequate secondary treatment and effluent chlorination.

TABLE C– 13. SUMMARY OF WATER QUALITY CONTROL NEEDS
UPPER WABASH SUBBASIN

| Identification of point of need[1/] | Existing supply 7-day, 1 in 10 low flow, cfs | 1980 | | 2020 | |
|---|---|---|---|---|---|
| | | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need |
| Celina | 0 | 16 | 97 | 33 | 97 |
| Coldwater | 0 | 5.4 | 97 | 8.8 | 97 |
| Bluffton | 4.7 | 7.9 | 95 | 21 | 95 |
| Huntington | 20 | 12 | 95 | 47 | 95 |
| Portland | 0.9 | 8 | 95 | 24 | 97 |
| Montpelier | 5.1 | 3 | 90 | 6.4 | 95 |
| Wabash-Lagro | 40 | 69 | 95 | 115 | 95 |
| Union City | 0 | 4.5 | 97 | 21 | 97 |
| Dunkirk | 0 | 3.1 | 97 | 3.8 | 95 |
| Hartford City | 0.3 | 31 | 97 | 73 | 97 |
| Jonesboro, Gas City, Fairmount | 10 | 18 | 95 | 28 | 95 |
| Marion | 16 | 64 | 95 | 236 | 97 |
| Peru | 87 | 32 | 90 | 114 | 95 |
| Grissom AFB | 4 | 6 | 95 | 6 | 95 |
| Columbia City | 2.4 | 6.4 | 97 | 14 | 97 |
| Warsaw-Winona Lake | 1.3 | 8.3 | 95 | 33 | 97 |
| Kokomo | 0 | 68 | 97 | 212 | 97 |
| Frankfort | 0 | 14 | 97 | 37 | 97 |
| Lafayette-West Lafayette | 535 | 530 | 90 | 1,120 | 95 |

1/ Upstream from effluent

2/ Based on 90% treatment efficiency

TABLE C– 14. SUMMARY OF WATER QUALITY CONTROL NEEDS
MIDDLE WABASH SUBBASIN

| Identification of point of need[1/] | Existing supply 7-day, 1 in 10 low flow, cfs | 1980 | | 2020 | |
|---|---|---|---|---|---|
| | | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need |
| Paxton | 0 | 3.7 | 97 | 7.4 | 97 |
| Rantoul-Chanute | 0 | 22.4 | 97 | 33.3 | 97 |
| Urbana-Champaign | 2.2 | 82 | 97 | 134 | 97 |
| Hoopeston | 0.7 | 13.9 | 97 | 22.9 | 97 |
| Danville | 12.8 | 133 | 97 | 270 | 97 |
| Georgetown | 0 | 3.5 | 97 | 7.1 | 97 |
| Lebanon | 0 | 8.2 | 97 | 11.7 | 97 |
| Crawfordsville | 4.4 | 16.5 | 97 | 36.0 | 97 |
| Rockville | 0 | 1.2 | 95 | 3.6 | 95 |
| Terre Haute | 900 | 659 | 90 | 1,361 | 95 |
| Paris | 0 | 12.8 | 97 | 39.5 | 97 |
| Marshall | 0 | 9.8 | 97 | 28.0 | 97 |
| Robinson | 0 | 13.4 | 97 | 67.5 | 97 |
| Sullivan | 0 | 2.4 | 95 | 5.2 | 95 |

1/ Upstream from effluent

2/ Based on 90% treatment efficiency

TABLE C– 15. SUMMARY OF WATER QUALITY CONTROL NEEDS
EMBARRAS RIVER SUBBASIN

| Identification of point of need[1/] | Existing supply 7-day, 1 in 10 low flow, cfs | 1980 | | 2020 | |
|---|---|---|---|---|---|
| | | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need |
| Tuscola | 0 | 4.3 | 97 | 12 | 97 |
| Charleston | 0 | 24 | 97 | 45 | 97 |
| Mattoon | 0 | 13 | 97 | 34 | 97 |
| Newton | 0 | 4.6 | 97 | 13 | 97 |

1/ Upstream from effluent

2/ Based on 90% treatment efficiency

TABLE C– 16. SUMMARY OF WATER QUALITY CONTROL NEEDS
LITTLE WABASH SUBBASIN

| Identification of point of need[1/] | Existing supply 7-day, 1 in 10 low flow, cfs | 1980 | | 2020 | |
|---|---|---|---|---|---|
| | | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need | CFS needed to maintain water quality[2/] | Efficiency requirement of treatment plant at point of need |
| Effingham | 0 | 7.8 | 97 | 23 | 97 |
| Flora | 0 | 10 | 97 | 37 | 97 |
| Olney | 0 | 14 | 97 | 42 | 97 |
| Fairfield | 0 | 13 | 97 | 61 | 97 |
| Albion | 0 | 2.1 | 97 | 5.1 | 97 |
| Carmi | 3.2 | 38 | 97 | 98 | 97 |
| Wayne City | 0 | 20 | 97 | 20 | 97 |

1/ Upstream from effluent

2/ Based on 90% treatment efficiency

## TABLE C–17. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES PATOKA SUBBASIN

| Tributary or mainstem of subbasin | Mileage location | Existing ($1,000) | | | | 1980 ($1,000) | | | | 2020 ($1,000) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total |
| Mainstem | 95-106 | 84.8 | 3.2 | 8.1 | 96.1 | 111.7 | 4.5 | 12.7 | 128.9 | 146.4 | 11.1 | 29.6 | 187.1 |
| Mainstem | 95-86 | 233.8 | 13.7 | 189.0 | 436.5 | 308.5 | 24.8 | 375.1 | 708.4 | 404.3 | 67.5 | 1,324.7 | 1,796.5 |
| Mainstem | 95-81 | 140.1 | 16.9 | 13.9 | 170.9 | 185.1 | 30.7 | 21.7 | 237.5 | 242.5 | 83.5 | 38.3 | 364.3 |
| Mainstem | 95-62 | 342.3 | 18.0 | 28.5 | 388.8 | 451.8 | 32.6 | 40.6 | 525.0 | 592.1 | 88.7 | 69.4 | 750.2 |
| Mainstem | 95-55 | 55.2 | 6.0 | 14.2 | 75.4 | 72.8 | 9.1 | 19.6 | 101.5 | 95.6 | 27.7 | 34.0 | 157.3 |
| Mainstem | 95-35 | 337.5 | 0.5 | 89.4 | 427.4 | 445.5 | 0.6 | 112.6 | 558.7 | 583.9 | 1.3 | 189.2 | 774.4 |
| Mainstem | 95-18 | 289.3 | 10.1 | 79.8 | 379.2 | 382.3 | 16.7 | 114.6 | 513.6 | 500.9 | 45.0 | 220.7 | 766.6 |
| Mainstem | 95-0 | 122.3 | 1.7 | 3.8 | 127.8 | 161.5 | 2.6 | 5.0 | 169.1 | 211.6 | 7.3 | 7.6 | 226.5 |
| TOTAL | | | | | 2,102.1 | | | | 2,942.7 | | | | 5,022.9 |

## TABLE C–18. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES EAST FORK WHITE SUBBASIN

| Tributary or mainstem of subbasin | Mileage location | Existing ($1,000) | | | | 1980 ($1,000) | | | | 2020 ($1,000) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total |
| Big Blue R | 96-49-190R-15-0 | 762.6 | 89.7 | 558.3 | 1,410.6 | 1,002.0 | 136.4 | 675.2 | 1,813.6 | 1,319.1 | 350.6 | 2,108.4 | 3,778.1 |
| Sugar Cr | 96-49-190R-20-0 | 186.5 | 0.5 | 18.7 | 205.7 | 246.3 | 0.8 | 24.7 | 271.8 | 322.8 | 2.0 | 32.7 | 357.5 |
| Driftwood R | 96-49-190L-0 | 222.2 | 37.5 | 24.7 | 284.4 | 293.3 | 86.3 | 51.3 | 430.9 | 384.3 | 185.8 | 234.8 | 804.9 |
| Flatrock R | 96-49-190R-0 | 317.1 | 54.3 | 126.6 | 498.0 | 418.5 | 95.6 | 222.6 | 736.7 | 548.5 | 239.9 | 814.9 | 1,603.3 |
| Clifty Cr | 96-49-185R-0 | 22.4 | 1.4 | 27.9 | 51.7 | 29.7 | 3.1 | 58.1 | 90.9 | 38.8 | 6.9 | 268.8 | 314.5 |
| Sand Cr | 96-49-175-0 | 32.2 | 1.9 | 3.6 | 37.7 | 42.5 | 4.1 | 5.1 | 51.7 | 55.7 | 10.5 | 7.7 | 73.9 |
| Big Cr | 96-49-130-52-0 | — | — | — | — | — | — | — | — | — | — | — | — |
| Graham Cr | 96-49-130-52-0 | — | — | — | — | — | — | — | — | — | — | — | — |
| E.F. Muscatatuck R | 96-49-130-52 | 655.5 | 58.2 | 20.2 | 733.9 | 848.1 | 82.2 | 24.3 | 954.6 | 1,111.4 | 215.0 | 31.8 | 1,358.2 |
| Vernon Fork | 96-49-130-24 | 642.7 | 68.9 | 64.5 | 776.1 | 848.4 | 104.8 | 87.3 | 1,040.5 | 1,111.9 | 286.6 | 130.7 | 1,529.2 |
| Muscatatuck R | 96-49-130-0 | 411.9 | 26.6 | 12.4 | 450.9 | 543.7 | 45.6 | 15.3 | 604.6 | 712.8 | 129.0 | 26.4 | 868.2 |
| Salt Cr | 96-49-92-0 | 69.9 | 1.2 | 7.7 | 78.8 | 92.3 | 1.6 | 10.2 | 104.1 | 120.6 | 3.9 | 16.4 | 140.9 |
| Indian Cr | 96-49-63-0 | — | — | — | — | — | — | — | — | — | — | — | — |
| Lost R | 96-49-35-0 | 275.0 | 25.8 | 141.0 | 441.8 | 349.1 | 35.0 | 215.9 | 600.0 | 457.5 | 90.5 | 416.0 | 964.0 |
| Mainstem | 96-49-0 | 2,549.9 | 256.8 | 211.7 | 3,018.4 | 3,324.6 | 464.6 | 394.7 | 4,183.9 | 4,357.1 | 1,285.7 | 1,540.2 | 7,183.0 |
| TOTAL | | | | | 7,988.0 | | | | 10,883.3 | | | | 18,975.7 |

## TABLE C– 19. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES WEST FORK WHITE SUBBASIN

| Tributary or mainstem of subbasin | Mileage location | Existing ($1,000) | | | | 1980 ($1,000) | | | | 2020 ($1,000) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total |
| Kilibuck Cr | 96-292-0 | 52.6 | 1.8 | 10.2 | 64.6 | 67.8 | 3.5 | 15.9 | 87.2 | 88.3 | 10.0 | 42.5 | 140.8 |
| Pipe Cr | 96-278 | 2.0 | 1.0 | 0 | 3.0 | 2.0 | 2.0 | 0 | 4.0 | 4.0 | 5.0 | 0 | 9.0 |
| Cicero Cr | 96-262-0 | 10.4 | 0 | 5.6 | 16.0 | 13.4 | 0 | 8.2 | 21.6 | 17.4 | 0 | 25.9 | 43.3 |
| Fall Cr | 96-233-0 | 73.9 | 0 | 544.1 | 618.0 | 95.4 | 0 | 1,159.0 | 1,254.4 | 124.2 | 0 | 2,728.8 | 2,853.0 |
| Pleasant Run | 96-228-0 | — | — | — | — | — | — | — | — | — | — | — | — |
| Eagle Cr | 96-227-0 | 11.8 | 0 | 1.2 | 13.0 | 15.2 | 0 | 1.5 | 16.7 | 19.7 | 0 | 2.0 | 21.7 |
| Little Buck Cr | 96-223-0 | — | — | — | — | — | — | — | — | — | — | — | — |
| Indian Cr | 96-187-0 | 49.1 | 1.1 | 6.0 | 56.2 | 63.4 | 1.4 | 6.6 | 71.4 | 82.6 | 3.6 | 13.6 | 99.8 |
| White Lick Cr | 96-200-0 | 84.6 | 3.3 | 20.6 | 108.5 | 109.2 | 5.7 | 30.0 | 144.9 | 142.2 | 16.8 | 86.9 | 245.9 |
| Bean Blossom Cr | 96-173-0 | 171.7 | 11.0 | 20.7 | 203.4 | 221.4 | 15.2 | 26.7 | 263.3 | 276.6 | 37.8 | 40.7 | 355.1 |
| Big Walnut Cr | 96-135-51L-0 | 281.0 | 49.1 | 37.4 | 367.5 | 362.4 | 74.5 | 49.9 | 486.8 | 471.9 | 177.0 | 78.3 | 727.2 |
| Mill Cr | 96-135-51R-0 | 337.6 | — | 33.8 | 371.4 | 435.5 | 0 | 43.5 | 479.0 | 567.1 | 0 | 56.7 | 623.8 |
| Eel River | 96-135-0 | 1,765.5 | 237.7 | 19.0 | 2,022.2 | 2,277.7 | 345.0 | 24.7 | 2,647.4 | 3,494.0 | 883.8 | 34.6 | 4,412.4 |
| Plummer Cr | 96-120-0 | 55.9 | 1.1 | 5.3 | 62.3 | 72.2 | 1.7 | 6.9 | 80.8 | 94.0 | 4.3 | 9.5 | 107.8 |
| Mainstem | 96-0 | 4,887.0 | 846.7 | 2,174.7 | 7,909.3 | 6,232.0 | 1,346.6 | 3,361.5 | 10,940.1 | 8,190.3 | 3,726.9 | 10,932.6 | 22,849.8 |
| TOTAL | | | | | 11,815.4 | | | | 16,497.6 | | | | 32,489.6 |

## TABLE C– 20. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES UPPER WABASH SUBBASIN

| Tributary or mainstem of subbasin | Mileage location | Existing ($1,000) | | | | 1980 ($1,000) | | | | 2020 ($1,000) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total |
| Rock Cr | 419-0 | 104.5 | 4.4 | 11.4 | 120.3 | 133.7 | 5.7 | 22.8 | 162.2 | 172.4 | 21.0 | 47.1 | 240.5 |
| Little R | 406-0 | 122.0 | 2.7 | 4.9 | 129.6 | 156.2 | 3.5 | 16.3 | 176.0 | 201.3 | 13.1 | 22.7 | 237.1 |
| Salamonie R | 394-0 | 250.5 | 8.9 | 26.2 | 285.6 | 320.7 | 11.6 | 34.9 | 367.2 | 413.3 | 42.6 | 51.3 | 507.2 |
| Mississinewa R | 375-0 | 96.9 | 0 | 145.9 | 242.8 | 134.2 | 0 | 202.8 | 337.0 | 160.0 | 0 | 744.1 | 904.1 |
| Eel River | 354-0 | 194.4 | 2.9 | 23.3 | 220.6 | 248.3 | 3.6 | 30.4 | 282.3 | 320.6 | 12.9 | 54.5 | 388.0 |
| Deer Cr | 329-0 | 162.2 | 4.0 | 42.9 | 209.1 | 207.6 | 5.1 | 63.7 | 276.4 | 256.6 | 18.1 | 207.1 | 481.8 |
| Tippecanoe R | 322-0 | 319.7 | 0.5 | 31.8 | 352.0 | 409.2 | 0.8 | 40.9 | 450.9 | 520.2 | 2.6 | 52.6 | 575.4 |
| Wildcat Cr | 317-0 | 301.3 | 3.1 | 52.9 | 357.3 | 385.8 | 4.1 | 75.5 | 465.4 | 555.2 | 10.7 | 128.4 | 694.3 |
| Mainstem | 312 | 678.5 | 33.1 | 151.0 | 862.6 | 868.9 | 42.4 | 211.7 | 1,123.0 | 1,074.4 | 147.3 | 621.9 | 1,843.6 |
| TOTAL | | | | | 2,779.9 | | | | 3,640.4 | | | | 5,872.0 |

## TABLE C– 21. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES MIDDLE WABASH SUBBASIN

| Tributary or mainstem of subbasin | Mileage location | Existing ($1,000) | | | | 1980 ($1,000) | | | | 2020 ($1,000) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total |
| Big Pine Cr | 288-2 | 11.6 | 1.3 | 1.4 | 14.3 | 15.0 | 1.6 | 1.8 | 18.4 | 19.2 | 5.5 | 3.0 | 27.7 |
| Vermilion R | 257-28-0 | 268.3 | 16.2 | 129.0 | 413.5 | 345.9 | 20.5 | 177.4 | 543.8 | 445.4 | 69.3 | 472.4 | 987.1 |
| Little Vermilion R | 248-0 | 30.1 | 0 | 3.0 | 33.1 | 38.9 | 0 | 3.9 | 42.8 | 50.0 | 0 | 5.0 | 55.0 |
| Sugar Cr | 245-0 | 116.3 | 33.9 | 22.6 | 172.8 | 150.0 | 42.8 | 30.6 | 223.4 | 192.7 | 145.5 | 83.5 | 421.7 |
| Raccoon Cr | 238-0 | 144.8 | 25.8 | 50.6 | 221.2 | 97.0 | 11.0 | 29.2 | 137.2 | 125.0 | 37.5 | 46.9 | 209.4 |
| Brouilletts Cr | 226-0 | 52.7 | 0.1 | 5.3 | 58.1 | 68.0 | 0.2 | 6.8 | 75.0 | 87.5 | 0.5 | 8.9 | 96.9 |
| Mainstem | 96 | 3,763.2 | 260.3 | 382.0 | 4,405.5 | 4,740.1 | 266.2 | 476.8 | 5,483.1 | 6,100.0 | 901.4 | 1,169.3 | 8,170.7 |
| TOTAL | | | | | 5,318.5 | | | | 6,523.7 | | | | 9,968.5 |



## TABLE C– 22. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES EMBARRAS SUBBASIN

| Tributary or mainstem of subbasin | Mileage location | Existing ($1,000) | | | | 1980 ($1,000) | | | | 2020 ($1,000) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total |
| Mainstem | 122-106 | 229.4 | 8.7 | 67.7 | 305.8 | 291.6 | 11.9 | 94.7 | 398.2 | 365.4 | 34.3 | 275.9 | 675.6 |
| Mainstem | 122-64 | 574.2 | 39.1 | 23.2 | 636.5 | 729.6 | 53.5 | 29.6 | 812.7 | | 155.0 | 47.1 | 1,115.9 |
| Mainstem | 122-44 | 311.2 | 50.2 | 25.3 | 386.7 | 395.4 | 71.8 | 33.3 | 500.5 | 495.0 | 213.0 | 65.1 | 773.1 |
| Mainstem | 122-9 | 934.5 | 88.6 | 89.2 | 1,112.3 | 1,186.8 | 126.5 | 115.6 | 1,428.9 | 1,485.8 | 371.7 | 182.2 | 2,039.7 |
| Mainstem | 122-8 | 76.5 | 3.7 | 76.2 | 156.4 | 97.1 | 5.4 | 170.3 | 272.8 | 121.5 | 15.9 | 301.8 | 439.2 |
| Mainstem | 122-0 | 159.3 | 18.8 | 5.4 | 183.5 | 202.3 | 26.9 | 7.0 | 236.2 | 253.3 | 80.2 | 9.9 | 343.4 |
| TOTAL | | | | | 2,781.2 | | | | 3,649.3 | | | | 5,386.9 |

## TABLE C– 23. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES LITTLE WABASH SUBBASIN

| Tributary or mainstem of subbasin | Mileage location | Existing ($1,000) | | | | 1980 ($1,000) | | | | 2020 ($1,000) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total |
| Mainstem | 15-40 | 2,074.9 | 114.6 | 98.7 | 2,288.2 | 2,757.5 | 158.3 | 134.1 | 3,049.9 | 3,584.3 | 408.2 | 237.4 | 4,229.9 |
| Skillet Fork | 15-40L-0 | 1,186.3 | 93.4 | 87.2 | 1,366.9 | 1,552.4 | 127.6 | 121.0 | 1,801.0 | 2,028.2 | 325.2 | 235.5 | 2,588.9 |
| Mainstem | 15-0 | 139.6 | 22.2 | 87.5 | 249.3 | 174.9 | 31.6 | 147.1 | 353.6 | 227.4 | 81.3 | 507.0 | 815.7 |
| TOTAL | | | | | 3,904.4 | | | | 5,204.5 | | | | 7,634.5 |

## TABLE C– 24. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES LOWER WABASH SUBBASIN

| Tributary or mainstem of subbasin | Mileage location | Existing ($1,000) | | | | 1980 ($1,000) | | | | 2020 ($1,000) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total | Agr | Trans | Urban | Total |
| Mainstem | 65 | 737.2 | 0.5 | 28.2 | 765.9 | 881.6 | 20.2 | 55.5 | 957.3 | 1,139.9 | 68.3 | 100.3 | 1,308.5 |
| Mainstem | 40 | 669.7 | 17.0 | 33.7 | 720.4 | 805.2 | 38.4 | 59.0 | 902.6 | 1,041.5 | 130.5 | 101.6 | 1,273.6 |
| Mainstem | 15 | 727.0 | 64.0 | 40.5 | 831.5 | 1,012.6 | 59.1 | 41.7 | 1,113.4 | 1,308.1 | 200.5 | 79.0 | 1,587.6 |
| Mainstem | 0 | 306.5 | 10.4 | 10.7 | 327.6 | 438.2 | 0 | 1.3 | 439.5 | 564.8 | 0 | 5.0 | 569.8 |
| TOTAL | | | | | 2,645.5 | | | | 3,412.8 | | | | 4,739.5 |

TABLE C–25. SUMMARY OF PRESENT AND PROJECTED FLOOD DAMAGES
WABASH BASIN

| Subbasin | Average annual flood damages ($1,000) | | |
|---|---|---|---|
| | Existing | 1980 | 2020 |
| Patoka | 2,102.1 | 2,942.7 | 5,022.9 |
| East Fork White | 7,988.0 | 10,883.3 | 18,975.7 |
| West Fork White | 11,815.4 | 16,497.6 | 32,489.6 |
| Upper Wabash | 2,779.9 | 3,640.4 | 5,872.0 |
| Middle Wabash | 5,318.5 | 6,523.7 | 9,968.5 |
| Embarras | 2,781.2 | 3,649.3 | 5,386.9 |
| Little Wabash | 3,904.4 | 5,204.5 | 7,634.5 |
| Lower Wabash | 2,645.5 | 3,412.8 | 4,739.5 |
| TOTAL | 39,335.0 | 52,754.3 | 90,089.6 |

TABLE C–26. SUMMARY OF TOTAL PROJECTED RECREATION NEEDS[1/]
(100,000 recreation days)

| Economic subarea | Present (1968) | 1980 | 2020 |
|---|---|---|---|
| I | 28.87 | 21.82 | 90.64 |
| II | 158.44 | 189.02 | 536.20 |
| III | 11.21 | 4.92 | 13.31 |
| IV | 50.94 | 40.49 | 118.70 |
| V | 29.10 | 28.29 | 82.19 |
| VI | 97.60 | 141.69 | 419.51 |
| TOTAL | 376.16 | 426.33 | 1,260.55 |

1/ Data shown is for unsatisfied needs, e.g., Demand minus Supply.

## 10. FISHING AND HUNTING NEEDS

Corollary to the recreation needs is the desire of the public to enjoy fishing and hunting activities. We probably have better techniques for measuring these needs – analysis of fishing and hunting licenses – than for the recreation needs. We find that increasing urbanization trends dampen considerably the growth in hunting requirements whereas fishing opportunities are desired by an increasing number of people but the annual fishing days per fisherman is down somewhat due to increased distance and time that the fisherman must travel to participate. To a great extent, however, there appears to be little hesitancy on the part of the hunter and fisherman to travel considerable distances and spend considerable time in travel if rewarded by a successful endeavor. Pollution of the Basin's streams has contributed significantly to a continued deterioration of stream fishing opportunities. Achievement of the stream water quality standards will revitalize the stream fishery resource. Additional measures will be needed for maximum viability of the streams for fishing. A summary of the hunting and fishing needs is presented in table C–27.

TABLE C–27. ANNUAL FISHING AND HUNTING NEEDS (1,000 MAN–DAYS)

| Economic subarea | Present (1968) | | 1980 | | 2020 | |
|---|---|---|---|---|---|---|
| | Fishing | Hunting | Fishing | Hunting | Fishing | Hunting |
| East Fork White and Patoka | 2,059.2 | 742.2 | 2,644.2 | 905.5 | 3,910.3 | 1,131.5 |
| West Fork White | 2,438.8 | 730.5 | 2,980.5 | 1,175.2 | 4,203.3 | 943.3 |
| Little Wabash | 444.6 | 236.7 | 555.8 | 254.0 | 766.0 | 304.3 |
| Embarras and Middle Wabash (Illinois) | 1,045.5 | 601.0 | 1,167.9 | 781.0 | 1,833.1 | 904.9 |
| Middle Wabash (Indiana) | 788.8 | 250.9 | 922.3 | 328.0 | 1,097.4 | 373.5 |
| Upper Wabash | 2,596.0 | 518.6 | 3,176.4 | 983.7 | 4,306.4 | 1,131.6 |
| Total Demand | 9,372.9 | 3,079.9 | 11,447.1 | 4,427.4 | 16,116.5 | 4,789.1 |
| Total Anglers Available | 614.7 | 278.2 | 807.5 | 457.3 | 1,117.3 | 591.1 |
| Total Unsatisfied Net Demand for Wabash Basin[1/] | | | 1,837.2 | 1,357.1 | 1,574.4 | 1,809.1 |

1/ Net demand for 1980, for example, is 1980 gross demand minus 1968 expressed demand plus opportunity lost minus opportunity gained. See Appendix I for details.

## 11. PRISTINE OPPORTUNITIES

Although a great majority of our population has demonstrated their desire to participate in the type of outdoor activities presented in paragraphs 9 and 10, a large and growing segment of our population desires to view and partake of the natural environment characteristic of our earlier historic era (pristine or pure and untouched) without crowding and in an atmosphere void of or with a minimum of human developments. We have no idea of the need or demand for this type of activity. However, we believe that this unquantified need and demand must be explicitly incorporated into the Plan Formulation. We therefore conclude that pristine opportunities should be preserved to the maximum extent feasible and that all relevant alternatives be considered when significant pristine opportunities are endangered by developments lest we lose in perpetuity significant portions of our natural and historical heritage. We must take those steps that reasonable people should take to assure that future generations have the opportunity to enjoy as good, if not better, pristine opportunities as we have enjoyed. We are convinced that the basin can sustain a viable and dynamic economic posture while at the same time protecting and preserving great portions of our natural and historical heritage. To do more might be desirable; to do less might be folly.

## 12. AGRICULTURAL WATER

In addition to the water supply needs as indicated in paragraph 6 there exists within the basin a need for water for farm domestic, livestock watering and other farm uses. Historically, the farmer has depended upon wells and small ponds to satisfy his requirements for water. However, as population pressures increase with resultant undesirable associated products emptying into our water courses and eventually into underground supplies, these historic sources are becoming undependable both in quantity and quality. In order to provide a satisfactory supply of water, Rural Water Districts are rapidly being formed to meet this need. It is proper and inevitable that each farm unit will soon have a safe and dependable water supply source just as farm units have been electrified by Rural Electric Administration programs. This study has not been directly concerned with distribution of these waters but rather with the adequacy of supply. A summary of these needs is presented in table C—28.

## 13. WATER FOR IRRIGATION

Historically, there has been only a nominal amount of irrigation in the basin, with normal rainfall patterns sufficing for economic crop production. However, as the pressures for increasing production mount, it is believed that irrigation would increase since increased production per acre and per farm unit would be required and larger farm units tend to make irrigation more of a prudent and profitable endeavor. In analyzing irrigation requirements, the suitable soil types and desirable root moisture conditions were concluded to be the dominant parameters. It was recognized that changes in technology and other circumstances, differing from those estimated, could significantly affect future irrigation practices. The amount of water projected to be required for irrigation is summarized in table C—29.

## 14. ELECTRIC GENERATING NEEDS

The demand for power is growing in the basin at a far greater rate than either the population or the production. This rapid rate of growth is attributable to several factors; namely, increasing use of electrical products in the home, industry and social institutions; the increased affluence of the populace; the desire of the populace to minimize discomfiture; the increased use of electrical products in order to obtain more usable time; and the increasing use of electrical products as a substitute for manual labor. Although

TABLE C–28. PRESENT AND PROJECTED RURAL FARM DOMESTIC, RURAL NON–FARM DOMESTIC AND LIVESTOCK WATER NEEDS

| | Economic subarea 1 | Economic subarea 2 | Economic subarea 3 | Economic subarea 4 | Economic subarea 5 | Economic subarea 6 | Total |
|---|---|---|---|---|---|---|---|
| | | | (million gallons per day) | | | | |
| | | | Rural Farm Domestic[1/] | | | | |
| 1960 | 6.54 | 8.92 | 2.79 | 4.85 | 2.12 | 11.44 | 36.66 |
| 1980 | 5.85 | 7.07 | 2.44 | 3.74 | 1.76 | 9.56 | 30.42 |
| 2000 | 4.74 | 5.31 | 1.88 | 2.73 | 1.42 | 7.31 | 23.39 |
| 2020 | 3.38 | 3.70 | 1.37 | 1.79 | 1.05 | 5.28 | 16.57 |
| | | | Rural Non-Farm Domestic[1/] | | | | |
| 1960 | 9.87 | 24.61 | 2.18 | 4.42 | 4.19 | 14.03 | 59.30 |
| 1980 | 12.16 | 30.84 | 3.02 | 6.39 | 5.14 | 18.51 | 76.06 |
| 2000 | 13.22 | 35.52 | 4.06 | 8.39 | 6.15 | 23.08 | 90.42 |
| 2020 | 13.57 | 38.59 | 5.06 | 9.87 | 6.90 | 26.84 | 100.83 |
| | | | Livestock | | | | |
| 1960 | 9.00 | 11.44 | 3.27 | 6.01 | 3.98 | 15.72 | 49.42 |
| 1980 | 10.98 | 15.83 | 5.41 | 8.42 | 6.66 | 19.74 | 67.04 |
| 2000 | 16.41 | 23.67 | 8.19 | 12.76 | 10.07 | 29.35 | 100.45 |
| 2020 | 22.11 | 32.01 | 11.12 | 17.32 | 13.67 | 39.65 | 135.88 |
| | | | Total | | | | |
| 1960 | 25.41 | 44.97 | 8.24 | 15.28 | 10.29 | 41.19 | 145.38 |
| 1980 | 28.99 | 53.74 | 10.87 | 18.55 | 13.56 | 47.81 | 173.52 |
| 2000 | 34.37 | 64.50 | 14.13 | 23.88 | 17.64 | 59.74 | 214.26 |
| 2020 | 39.06 | 74.30 | 17.55 | 28.98 | 21.62 | 71.77 | 253.28 |

1/ Not served by municipal water systems.

TABLE C–29. ESTIMATED WATER FOR PRESENT AND EXPECTED FUTURE IRRIGATION NEEDS

| Economic subarea | Estimated 1968 use | | 1980 | | 2020 | |
|---|---|---|---|---|---|---|
| | Average year | Driest year | Average year | Driest year | Average year | Driest year |
| | (acre-feet) | | | | | |
| 1. East Fork White and Patoka | 1,900 | 3,200 | 3,150 | 5,350 | 6,050 | 10,400 |
| 2. West Fork White | 900 | 1,515 | 1,500 | 2,550 | 2,760 | 4,750 |
| 3. Little Wabash | 900 | 1,500 | 1,350 | 2,300 | 3,000 | 5,200 |
| 4. Emarras and Mid-Wabash (Illinois) | 1,750 | 3,000 | 2,700 | 4,600 | 4,300 | 7,300 |
| 5. Mid-Wabash (Indiana) | 950 | 1,600 | 1,400 | 2,450 | 2,800 | 4,800 |
| 6. Upper Wabash | 1,750 | 2,965 | 2,800 | 4,800 | 5,900 | 10,100 |
| TOTAL | 8,150 | 13,780 | 12,900 | 22,050 | 24,810 | 42,550 |

NOTE: Water requirements for each projection year are gross estimates which are based on 75 percent application efficiency. Does not include storage or abnormal transmission losses.

there are many ways to cool electrical generating plants, the only ones in use today utilize water for cooling. A substantial problem faces the electrical generating industry at the present time. This problem may be simply stated as "How can the future requirements for electrical energy be met while at the same time minimizing the adverse effects on the environment and minimizing stream thermal pollution?" Reasonable solutions to this problem must be found by reasonable people reasoning together. A summary of the electrical energy and installed capacity needed to supply that energy is listed in table C–30.

At the present time the cooling for many of the existing plants in the basin utilizes "once through" water. The water, heated as it cools the generators, returns to the stream or water course several degrees warmer and thus may have an adverse effect on the stream's food chain support systems and perhaps on higher organisms. It has been determined that there are only a few locations within the basin where there is sufficient stream flow to support this kind of cooling in keeping with the established water quality standards. As indicated in Appendix K, it is projected that future cooling will utilize the "evaporative principle" whereby water is extracted from the stream and evaporated into the atmosphere. Cooling ponds are somewhat a combination of "once through" and evaporation principles utilizing substantial quantities of water; evaporating considerable; and recirculating the water without its returning to the water course with temperatures in excess of those allowed by the standards. The amount of makeup water projected to be required to satisfy the electrical energy generation demands is shown in table C–31.

## 15. WATER FOR PRESERVATION OF THE STREAM ENVIRONMENT

As the demands for consumptive use of water increases the stream environments as we know them today will deteriorate. As the population increases and more water is extracted from the streams for municipal and industrial uses, for cooling purposes, for agricultural uses, and for irrigation, less water will be available to support and maintain the stream environment. This reduced amount of water will be particularly critical during times

TABLE C–30. PROJECTED ELECTRIC POWER REQUIREMENTS
WABASH POWER REGION

| Power subregion | Energy | Peak | Average annual energy growth rate |
|---|---|---|---|
| | (million kwh) | (1,000 kw) | (percent) |
| | | 1965 | |
| I | 186 | 45 | — |
| II | 2,015 | 368 | — |
| III | 7,190 | 1,342 | — |
| IV | 3,837 | 703 | — |
| V | 3,051 | 577 | — |
| VI | 578 | 109 | — |
| VII | 387 | 72 | — |
| VIII | 369 | 67 | — |
| TOTAL | 17,613 | 3,283 | — |
| | | 1980 | |
| I | 508 | 123 | 6.9 |
| II | 5,502 | 1,009 | 6.9 |
| III | 19,523 | 3,660 | 6.9 |
| IV | 10,430 | 1,918 | 6.9 |
| V | 8,290 | 1,573 | 6.9 |
| VI | 1,575 | 300 | 6.9 |
| VII | 1,053 | 197 | 6.9 |
| VIII | 1,005 | 183 | 6.9 |
| TOTAL | 47,886 | 8,963 | 6.9 |
| | | 2000 | |
| I | 1,718 | 406 | 6.3 |
| II | 18,631 | 3,336 | 6.3 |
| III | 66,108 | 12,095 | 6.3 |
| IV | 35,316 | 6,340 | 6.3 |
| V | 28,068 | 5,199 | 6.3 |
| VI | 5,335 | 992 | 6.3 |
| VII | 3,568 | 652 | 6.3 |
| VIII | 3,405 | 604 | 6.3 |
| TOTAL | 162,149 | 29,624 | 6.3 |

TABLE C–30. PROJECTED ELECTRIC POWER REQUIREMENTS
WABASH POWER REGION (CONTINUED)

| Power subregion | Energy | Peak | Average annual energy growth rate |
|---|---|---|---|
| | (million kwh) | (1,000 kw) | (percent) |
| | 2020 | | |
| I | 4,309 | 1,010 | 4.7 |
| II | 46,703 | 8,299 | 4.7 |
| III | 165,717 | 30,092 | 4.7 |
| IV | 88,528 | 15,772 | 4.7 |
| V | 70,359 | 12,934 | 4.7 |
| VI | 13,372 | 2,469 | 4.7 |
| VII | 8,942 | 1,621 | 4.7 |
| VIII | 8,536 | 1,503 | 4.7 |
| TOTAL | 406,466 | 73,700 | 4.7 |

TABLE C–31. MAKEUP WATER REQUIRED
FOR STEAM–ELECTRIC GENERATION

| Hydrologic subbasin | Required acre-feet per year[1/] | | |
|---|---|---|---|
| | Present | 1980 | 2020 |
| Patoka River | 189 | 16 | — |
| East Fork White River | 90 | — | — |
| West Fork White River | 7,573 | 15,883 | 138,092 |
| Upper Wabash River | 636 | 188 | 93,234 |
| Middle Wabash River | 9,198 | 18,303 | 139,726 |
| Embarras River | — | — | — |
| Little Wabash River | 87 | 34 | — |
| Lower Wabash River | 119 | 35 | 63,701 |
| TOTAL | 17,892 | 34,459 | 434,753 |

1/ Amounts shown are evaporative losses incurred during power plant operation.

of drought, for then the greatest demands will be placed on the stream system. During these periods which will be more severe and more prolonged by virtue of increased demands on the stream's water, the stream's characteristic as a stream could be seriously altered – all fish life could be essentially eradicated, the plant life along the stream would be altered and many of the amphibians would be lost. In order that consideration be given to preventing such a catastrophe, the Plan Formulation Subcommittee has estimated the flow needs required at key points to sustain a viable stream environment.

## 16. PRESERVATION AND ENHANCEMENT OF THE BASIN'S FOOD AND FIBER PRODUCTIVE CAPABILITY

Historically, the Wabash Basin has had a dominant rural characteristic with agricultural pursuits as the prime economic endeavor. With the demise of the "family farm" there are strong indications of an emerging more industrial type agricultural economy. The amount of land available within the basin is fixed. The trend toward greater urbanization results in a withdrawal of land from agricultural production; thus placing relatively greater demand on the remaining farmland. With the land available for production decreasing, and the demand for food and fiber increasing the production per unit of farmland must be increased To achieve this greater production capability several steps need to be taken:

**a.** Improve land fertility by improved crop practice and by artificial means.

**b.** Retain productive capability by adequate land treatment measures whereby the fertile topsoil is retained at the point of need rather than being transported to downstream points.

**c.** Improve soil moisture condition by drainage or irrigation where a determination is made that crop production is the highest and best use of land.

**d.** Reduce urban intrusions into the most productive lands.

Present projections indicate that by about the year 2000 additional resource development will be needed in the basin in order to help meet the national demand for food and fiber. The present and projected future use of land is given in tables C–32 and C–33.

## 17. PRESERVATION AND ENHANCEMENT OF THE BASIN'S FOREST RESOURCE CAPABILITY

As the population of the basin increases, so will the need for forest goods and services. The Basin's forests have the potential for providing substantially more goods and services than are being provided at the present time. To accomplish this will require that better forest management be practiced on private lands. There needs to be an improved balance between forest lands, farm lands and urban lands. There needs to be an improved balance between forest lands, farm lands and urban lands. Contrary to the short time it requires to convert lands to farm and urban uses, the time element required to develop a forest is quite long. Thus, a more enlightened future forest planning program is necessitated. Present forest acreage is shown in table C–32 and is projected to remain relatively constant.

TABLE C–32. PRESENT LAND USE (1968)

| Economic subarea | Cropland | Pasture land | Total agricultural land | Forest | Urban | Other | Total land area |
|---|---|---|---|---|---|---|---|
| 1 | 1,963,550 | 461,080 | 2,424,630 | 1,358,000 | 174,410 | 455,990 | 4,413,030 |
| 2 | 2,736,170 | 461,100 | 3,197,270 | 634,000 | 378,410 | 242,180 | 4,451,860 |
| 3 | 1,371,910 | 286,130 | 1,659,040 | 355,000 | 107,430 | 122,340 | 2,243,810 |
| 4 | 2,758,810 | 323,960 | 3,082,770 | 299,000 | 190,790 | 158,370 | 3,730,930 |
| 5 | 1,404,350 | 215,780 | 1,620,130 | 293,000 | 87,520 | 71,920 | 2,072,570 |
| 6 | 3,856,040 | 375,030 | 4,231,070 | 412,240 | 262,250 | 203,010 | 5,108,570 |
| TOTAL | 14,091,830 | 2,123,080 | 16,214,910 | 3,351,240 | 1,200,810 | 1,253,810 | 22,020,770 |

TABLE C–33. PROJECTED LAND USE REQUIREMENTS
(million acres)

| Land use | 1980 | | 2000 | 2020 |
|---|---|---|---|---|
| | Without additional development | With additional development | | |
| Cropland | 13.14 | 13.07 | 13.27 | 12.97 |
| Pasture | 2.06 | 2.06 | 2.01 | 1.96 |
| Idle | 0.80 | 0.87 | 0.25 | 0.25 |
| Forest | 3.35 | 3.35 | 3.35 | 3.35 |
| Urban | 1.42 | 1.42 | 1.89 | 2.24 |
| Other | 1.24 | 1.24 | 1.24 | 1.24 |
| TOTAL | 22.01 | 22.01 | 22.01 | 22.01 |

## SECTION III – NET NEEDS AFTER IMPACT OF "GOING PROGRAM"

### 18. GENERAL

The needs as previously presented are premised on certain projects – Federal, state, local and private, operable on 31 December 1968. Thus, the needs as previously presented represent the net needs after the effects of the operating program have been subtracted. Table C–34 indicates the operable projects.

In addition to the projects listed, there are a number of projects which we term the "going program". These "going program" projects either became operable after 31 December 1968 or are authorized, approved, or under construction. A listing of these projects is included in table C-35 along with those needs which they will satisfy.

### 19. FLOOD DAMAGE REDUCTION

Of particular concern are the flood damages that could be reduced by sound flood plain management practices. At this stage in development of our flood prevention rationale it appears that flood plain management would have the greatest impact on future urban development. Consequently, the projected urban damages can be reduced in anticipation of management techniques being effected. Table C–36 depicts the flood damage picture after implementation of the going program with sound flood plain management, residual urban damages for the 2020 time frame could reasonably be expected to be reduced by 25 to 50 percent.

TABLE C– 34. WABASH RIVER BASIN WATER RESOURCES PROGRAM
OPERABLE 31 DECEMBER 1968

| | | |
|---|---|---|
| **MAJOR RESERVOIRS** | | |
| Cagles Mill | Monroe | Mississinewa |
| Mansfield | Salamonie | Huntington |
| **LEVEES AND LOCAL PROTECTION PROJECTS** | | |
| Lyford | Levee Unit 8 | Vincennes |
| Gill Township | Levee Unit 5 | Indianapolis |
| Niblack | Delphi | Muncie |
| Brevoort | Terre Haute | |
| **UPSTREAM WATERSHED PROJECTS** | | |
| Elk Creek | Little Wea Creek | Prairie Creek |
| Boggs Creek | French Lick Creek | Upper Wabash |

TABLE C–35. WABASH RIVER BASIN WATER RESOURCE PROGRAM
1968 GOING PROGRAM

## MAJOR RESERVOIRS

Big Blue
Big Pine
Big Walnut
Clifty Creek
Downeyville
Helm
Lafayette
Lincoln
Louisville
Patoka

## LEVEES AND LOCAL PROTECTION PROJECTS

Anderson
Levee Unit 3
Levee Unit 1
Levee Unit 2
Levee Unit 3 & 4
Levee Unit 9
Levee Unit 10
Shoals
Sugar Creek
Russell & Allison
Levee Unit 6
Adams
Clinton, Indiana
Deer Creek Prairie
Honey Creek
West Terre Haute
England Pond
Greenfield Bayou
Island Levee
Rochester and McCleary's Bluff
Tri-Pond
Bonpas Creek
Fletcher & Sunshine Gardens
Levee Unit 2
Levee Unit 1
Levee Unit 2
Levee Unit 1
Levee Unit 2
Levee Unit 1
Levee Unit 7
Levee Unit 17
McGinnis
New Harmony
Raccoon
Shufflebarger
Orleans
Mount Carmel
Marion

## UPSTREAM WATERSHED PROJECTS

Upper Wabash
Rock Cr - Wells Co
Mill Cr - Fulton Co
Bachelor Run
Prairie Cr - Daviess Co
Lattas Creek
Mill Creek
Indian Creek
Prides Creek
Stucker Fork
DeWitt Creek
Twin RushCreek
Upper Big Blue River
West Boggs Creek
Busseron Creek
Kickapoo Creek
Prairie Cr – Vigo Co
Little Raccoon Creek
Scattering Fork
Seven Mile Creek

## TABLE C–36. SUMMARY OF AVERAGE ANNUAL FLOOD DAMAGES
December 1968 Price levels ($1,000)

| No | Subbasin and damage category | Average annual damages - no federal projects | Residual average annual damage existing projects | | | Residual average annual damages existing and authorized projects | | Residual average annual damages existing, authorized and early action plan projects | | Residual average annual damages existing, authorized early action and long range plan projects |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1968 | 1968 | 1980 | 2020 | 1980 | 2020 | 1980 | 2020 | 2020 |
| 1 | PATOKA RIVER | | | | | | | | | |
| | Crop and pasture | 1,351.0 | 1,351.0 | 1,783.0 | 2,337.0 | 1,471.0 | 1,920.0 | 580.0 | 761.0 | 625.0 |
| | Other agriculture | 255.0 | 255.0 | 336.0 | 441.0 | 270.0 | 354.0 | 79.0 | 103.0 | 71.0 |
| | Transportation | 70.0 | 70.0 | 122.0 | 332.0 | 92.0 | 218.0 | 21.0 | 55.0 | 41.0 |
| | Urban | 202.0 | 202.0 | 392.0 | 1,383.0 | 129.0 | 447.0 | 70.0 | 241.0 | 237.0 |
| | Other | 225.0 | 225.0 | 310.0 | 531.0 | 278.0 | 474.0 | 108.0 | 174.0 | 129.0 |
| | TOTAL | 2,103.0 | 2,103.0 | 2,943.0 | 5,024.0 | 2,240.0 | 3,413.0 | 858.0 | 1,334.0 | 1,103.0 |
| 2 | EAST FORK WHITE RIVER | | | | | | | | | |
| | Crop and pasture | 4,681.0 | 4,602.0 | 6,009.0 | 7,881.0 | 4,784.0 | 6,268.0 | 3,013.0 | 3,950.0 | 3,834.0 |
| | Other agriculture | 1,607.0 | 1,545.0 | 2,028.0 | 2,656.0 | 1,354.0 | 1,774.0 | 1,026.0 | 1,345.0 | 1,341.0 |
| | Transportation | 698.0 | 623.0 | 1,061.0 | 2,807.0 | 735.0 | 1,971.0 | 528.0 | 1,405.0 | 1,397.0 |
| | Urban | 897.0 | 890.0 | 1,355.0 | 5,309.0 | 705.0 | 2,810.0 | 654.0 | 2,565.0 | 2,506.0 |
| | Other | 328.0 | 328.0 | 429.0 | 632.0 | 357.0 | 546.0 | 174.0 | 270.0 | 254.0 |
| | TOTAL | 8,211.0 | 7,988.0 | 10,882.0 | 18,971.0 | 7,935.0 | 13,369.0 | 5,395.0 | 9,535.0 | 9,386.0 |
| 3 | WEST FORK WHITE RIVER | | | | | | | | | |
| | Crop and pasture | 5,824.0 | 4,968.0 | 6,336.0 | 8,771.0 | 5,346.0 | 6,953.0 | 2,833.0 | 3,786.0 | 3,682.0 |
| | Other agriculture | 3,815.0 | 2,817.0 | 3,630.0 | 4,803.0 | 3,050.0 | 3,971.0 | 967.0 | 1,257.0 | 1,252.0 |
| | Transportation | 1,385.0 | 1,153.0 | 1,797.0 | 4,866.0 | 1,687.0 | 4,581.0 | 551.0 | 1,480.0 | 1,460.0 |
| | Urban | 5,063.0 | 2,605.0 | 4,386.0 | 13,524.0 | 1,757.0 | 6,006.0 | 893.0 | 3,359.0 | 2,958.0 |
| | Other | 292.0 | 274.0 | 349.0 | 528.0 | 292.0 | 443.0 | 181.0 | 281.0 | 299.0 |
| | TOTAL | 16,379.0 | 11,817.0 | 16,498.0 | 32,492.0 | 12,132.0 | 21,954.0 | 5,425.0 | 10,163.0 | 9,651.0 |
| 4 | UPPER WABASH RIVER | | | | | | | | | |
| | Crop and pasture | 2,321.0 | 2,052.0 | 2,637.0 | 3,380.0 | 2,394.0 | 3,121.0 | 1,540.0 | 2,032.0 | 1,649.0 |
| | Other agriculture | 461.0 | 178.0 | 228.0 | 294.0 | 218.0 | 282.0 | 166.0 | 214.0 | 144.0 |
| | Transportation | 101.0 | 60.0 | 78.0 | 269.0 | 71.0 | 265.0 | 52.0 | 196.0 | 175.0 |
| | Urban | 714.0 | 288.0 | 413.0 | 1,508.0 | 398.0 | 1,450.0 | 388.0 | 1,428.0 | 853.0 |
| | Other | 213.0 | 203.0 | 287.0 | 421.0 | 260.0 | 388.0 | 164.0 | 255.0 | 214.0 |
| | TOTAL | 3,810.0 | 2,781.0 | 3,643.0 | 5,872.0 | 3,341.0 | 5,506.0 | 2,310.0 | 4,125.0 | 3,035.0 |

TABLE C–36. SUMMARY OF AVERAGE ANNUAL FLOOD DAMAGES (CONTINUED)
December 1968 Price Levels ($1,000)

| No | Subbasin and damage category | Average annual damages - no federal projects | Residual average annual damages existing projects | | | Residual average annual damages existing and authorized projects | | Residual average annual damages existing, authorized, and early action plan projects | | Residual average annual damages existing, authorized, early action and long range plan projects |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1968 | 1968 | 1980 | 2020 | 1980 | 2020 | 1980 | 2020 | 2020 |
| 5 | MIDDLE WABASH RIVER | | | | | | | | | |
| | Crop and pasture | 3,945.0 | 2,928.0 | 3,592.0 | 4,623.0 | 3,027.0 | 3,894.0 | 2,049.0 | 2,633.0 | 1,999.0 |
| | Other agriculture | 2,464.0 | 1,459.0 | 1,863.0 | 2,397.0 | 1,337.0 | 1,721.0 | 976.0 | 1,257.0 | 705.0 |
| | Transportation | 481.0 | 338.0 | 343.0 | 1,158.0 | 283.0 | 957.0 | 204.0 | 690.0 | 491.0 |
| | Urban | 592.0 | 291.0 | 377.0 | 1,173.0 | 341.0 | 1,064.0 | 187.0 | 563.0 | 473.0 |
| | Other | 367.0 | 303.0 | 351.0 | 616.0 | 317.0 | 549.0 | 347.0 | 634.0 | 261.0 |
| | TOTAL | 7,849.0 | 5,319.0 | 6,526.0 | 9,967.0 | 5,305.0 | 8,185.0 | 3,763.0 | 5,777.0 | 3,929.0 |
| 6 | EMBARRAS RIVER | | | | | | | | | |
| | Crop and pasture | 1,879.0 | 1,879.0 | 2,386.0 | 2,988.0 | 1,500.0 | 1,879.0 | 685.0 | 858.0 | 641.0 |
| | Other agriculture | 407.0 | 407.0 | 516.0 | 647.0 | 130.0 | 163.0 | 59.0 | 74.0 | 52.0 |
| | Transportation | 209.0 | 209.0 | 296.0 | 870.0 | 102.0 | 296.0 | 38.0 | 112.0 | 76.0 |
| | Urban | 117.0 | 117.0 | 141.0 | 524.0 | 88.0 | 305.0 | 83.0 | 292.0 | 254.0 |
| | Other | 170.0 | 170.0 | 310.0 | 358.0 | 160.0 | 238.0 | 78.0 | 119.0 | 94.0 |
| | TOTAL | 2,782.0 | 2,782.0 | 3,649.0 | 5,387.0 | 1,980.0 | 2,881.0 | 943.0 | 1,455.0 | 1,117.0 |
| 7 | LITTLE WABASH RIVER | | | | | | | | | |
| | Crop and pasture | 2,876.0 | 2,876.0 | 3,803.0 | 4,953.0 | 2,880.0 | 3,748.0 | 2,032.0 | 2,646.0 | 2,104.0 |
| | Other agriculture | 524.0 | 524.0 | 682.0 | 887.0 | 486.0 | 633.0 | 410.0 | 534.0 | 476.0 |
| | Transportation | 230.0 | 230.0 | 318.0 | 815.0 | 203.0 | 561.0 | 172.0 | 444.0 | 404.0 |
| | Urban | 114.0 | 114.0 | 193.0 | 685.0 | 126.0 | 409.0 | 104.0 | 369.0 | 308.0 |
| | Other | 160.0 | 160.0 | 209.0 | 295.0 | 173.0 | 242.0 | 99.0 | 141.0 | 83.0 |
| | TOTAL | 3,904.0 | 3,904.0 | 5,205.0 | 7,635.0 | 3,868.0 | 5,593.0 | 2,817.0 | 4,134.0 | 3,375.0 |
| 8 | LOWER WABASH RIVER | | | | | | | | | |
| | Crop and pasture | 1,636.0 | 1,502.0 | 1,936.0 | 2,504.0 | 1,756.0 | 2,273.0 | 1,221.0 | 1,578.0 | 1,258.0 |
| | Other agriculture | 1,014.0 | 938.0 | 1,202.0 | 1,550.0 | 948.0 | 1,222.0 | 868.0 | 1,119.0 | 1,028.0 |
| | Transportation | 100.0 | 92.0 | 118.0 | 399.0 | 108.0 | 366.0 | 56.0 | 191.0 | 141.0 |
| | Urban | 6.0 | 6.0 | 8.0 | 32.0 | 8.0 | 29.0 | 3.0 | 11.0 | 10.0 |
| | Other | 115.0 | 107.0 | 149.0 | 354.0 | 140.0 | 236.0 | 71.0 | 122.0 | 84.0 |
| | TOTAL | 2,871.0 | 2,645.0 | 3,413.0 | 4,739.0 | 2,960.0 | 4,126.0 | 2,219.0 | 3,012.0 | 2,521.0 |

TABLE C–36. SUMMARY OF AVERAGE ANNUAL FLOOD DAMAGES (CONTINUED)
December 1968 Price Levels ($1,000)

| No | Subbasin and damage category | Average annual damages - no federal projects | Residual average annual damages existing projects | | | Residual average annual damages existing and authorized projects | | Residual average annual damages existing, authorized and early action plan projects | | Residual annual annual damages existing, authorized, early action and long range plan projects |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1968 | 1968 | 1980 | 2020 | 1980 | 2020 | 1980 | 2020 | 2020 |
| | TOTAL OF SUBBASINS | | | | | | | | | |
| | Crop and pasture | 24,513.0 | 22,158.0 | 28,482.0 | 37,437.0 | 23,138.0 | 30,056.0 | 13,953.0 | 18,244.0 | 15,793.0 |
| | Other agriculture | 10,547.0 | 8,123.0 | 10,485.0 | 13,675.0 | 7,793.0 | 10,120.0 | 4,551.0 | 5,903.0 | 5,069.0 |
| | Transportation | 3,274.0 | 2,775.0 | 4,133.0 | 11,516.0 | 3,281.0 | 9,215.0 | 1,622.0 | 4,573.0 | 4,184.0 |
| | Urban | 7,705.0 | 4,513.0 | 7,265.0 | 24,138.0 | 3,552.0 | 12,520.0 | 2,382.0 | 8,828.0 | 7,599.0 |
| | Other | 1,870.0 | 1,770.0 | 2,394.0 | 3,635.0 | 1,977.0 | 3,116.0 | 1,222.0 | 1,996.0 | 1,418.0 |
| | TOTAL | 47,909.0 | 39,339.0 | 52,759.0 | 90,401.0 | 39,761.0 | 65,027.0 | 23,730.0 | 39,544.0 | 34,063.0 |

## SECTION IV – ALTERNATIVE MEANS OF MEETING NET NEEDS

### 20. GENERAL

In developing a plan to meet anticipated needs, a myriad of alternative means must be considered. These alternative means, ranging from doing nothing to rather sophisticated systems, need to be costed as if the needs were to be met by single-purpose solutions. In general, the alternatives fall into several categories which are listed below:

#### a. Do Nothing

All too often when a need is anticipated the first inclination is to develop some kind of a "glamorous solution" whereas that apparent solution may create more problems for the future than it solves. Therefore, it may be that for certain kinds of needs "doing nothing" may be the most efficient solution. However, for other kinds of needs, particularly where the needs are physically satisfying as contrasted to spiritually satisfying, "doing nothing" is seldom, if ever, a viable alternative. For example, where the available water is insufficient to meet the domestic and industrial water needs of an area "doing nothing" is not a relevant alternative. Some means must be developed to bring the needed water to the point of need or to relocate the populace, or part of it, to where there is sufficient water and other resources so that the populace might live meaningfully.

#### b. Long Term Logic

In any planning for the use of natural resources to meet the need for a growing populace one is confronted with the realization that at some time there must be a limit on the number of people that the resource base can sustain. However, it is difficult for the natural resource planner to come to grips with population controls. This problem transcends many disciplines and institutions and goes to the heart of "individual preference". Although we recognize the necessity of population controls in the world, the nation and the basin, we have addressed ourselves to meeting the needs of the projected population for fifty years ahead. For a meaningful population control program to be effected it must first be established for the World and the Nation and the Wabash Basin fitted into that broad program. It will not be easy for it grates on the sensitivity of free institutions and individuals in many ways. However, it must be done for even with excellent foresight, optimum use of the resource base, scientific and technological advances, the supportive needs of an ever increasing populace will outstrip the available natural resource base at some time. We are convinced that everything we are planning and doing today is only temporary if the following measures are not effected for the long term.

(1) **Population Control.** Population growth needs to be kept in harmony with the available natural resource base and the availability of nature to renew that resource base.

(2) **Resource Recycling.** Technology needs to be applied to recycling of basic natural resources rather than continuing to deplete the basic natural resources base. Much of our present effort goes into "curing the disease" rather than "correcting the cause". For example we properly are concerned with "waste treatment" as a means of improving water quality. However, wastes as we know them are not wastes at all but rather a misplaced resource with a tremendous capability to benefit mankind if recycled properly. Another example lies in the low efficiency involved in the production of electrical energy. Present technology only allows us to extract about 40 percent of the energy in fossil fuels with the remainder being lost as a benefit to mankind. We need to either improve the efficiency

of electrical generating plants or determine how to efficiently use the unused energy. This would reduce the extraction of the relatively non-replaceable fossil fuel (or nuclear material) and reduce the input of heat energy into the atmosphere and water courses.

(3) **Population Demand.** With a fixed capability of the natural resource base to withstand population pressures at any given location, excess population pressures can stress the base beyond its assimilative capability. If the projected population growth is more evenly distributed the ability of the resource base to assimilate the load is significantly increased. It is a fact that any structure can withstand a greater load if the load is distributed rather than concentrated. We should apply this knowledge by encouraging population dispersal thereby assuring that the atmosphere and water courses can better assimilate those by-products of man's endeavors after maximum elimination of the undesirable by-products at their source.

## 21. STRUCTURAL MODIFICATIONS

Irrespective of any and all of the other alternatives, structural modification must be effected if the fixed resource base is to adjust to meet man's numbers, needs and desires. Structural modifications usually involve a rearranging of basic resources. Structural modifications – whether a dam, channel work, levee, parks or sewage treatment plants – represent man's endeavor to aid nature in doing what nature could do by itself if man were not accelerating his demands on nature faster than nature can adjust to accommodate man and man's needs. Structural modifications while neither the "panacea" nor "bug-a-boo" that are claimed by some are necessary if most efficient use is to be made of replaceable resources. The structural modifications considered in this study are discussed in the following paragraphs for each category of water and water related needs.

### a. Municipal and Industrial Water Supply

There are several basic alternatives which are considered to meet present and future needs.

(1) **Storage of Water.** Storage of water – whether in lakes and ponds, or in geologic formations – provides a mechanism wherein excess water is "banked" until needed. Such storage has a dampening effect on both floods and droughts. The Wabash Basin has historically received about forty inches of precipitation each year. The runoff from this forty inches amounts to an average of about thirteen inches with the remainder being absorbed by plants, soil and atmosphere. Thus, only about one-third of the moisture that falls on the basin is useable for surface storage purposes and for dampening out the extreme low (drought) flows. Municipal and industrial water uses must be carefully considered lest the by-products of man's endeavors leave the water unuseable for the other purposes without an undue amount of corrective treatment. Storage can be effected in multiple purpose projects or in single purpose structures for municipal and industrial use. Multiple purpose structures are considered superior to single purpose structures since a greater resource use benefiting more people is possible. Thus in plan formulation multiple purpose structures were accorded a preferred position to single purpose structures.

(2) **Ground Water.** Where available in adequate quantity and quality, the use of ground water to meet municipal and industrial water supply needs was always considered. This takes the form of developing new ground water aquifers or expanding the use of presently developed aquifers. The use of ground water was concluded to be a "realistic" alternative only when that which was withdrawn could be replaced. This

replacement may be either through normal infiltration processes or by artificial (pumping) processes. Artificial recharge necessitates a dam or similar structure whereby a supply for recharge can be obtained. Thus artificial recharge storage water in the voids within the crust of the earth, can be compared with surface storage in a reservoir or lake. Normal infiltration or recharge takes place through seepage from both the earth's land surface and from water courses. In keeping with the principle of "retaining options" where it was not concluded that the water withdrawn could be replaced, other alternatives were considered. The subcommittee was concerned lest water withdrawn from ground aquifers would exceed replenishment rates and would cause lower water tables and significant changes in soil moisture conditions which among other things could radically alter the ecology of the affected area. We were greatly concerned with the lack of our present ability to predict what the total cost would be by overuse of the ground water resource. We were equally concerned that we should make optimum use of ground water and it was therefor given prime priority in meeting many municipal and industrial water supply needs.

(3) **Regional Systems.** A number of opportunities exist for communities to share in a system development for supplying and distributing water which would collectively be more efficient than each community operating independently. In a number of cases the most efficient thing for a community to do would be to buy water from neighboring communities which have an adequate source of supply. Our thinking regarding regional systems is in its infancy and the potentials are limited only by our imagination and initiative in furthering its use. In the future, large regional municipal and industrial water supply systems could be similar to electrical power grids in use at the present time. Such regionalized systems could minimize the adverse effects of localized drought conditions and minimize the reserves that must be maintained as insurance against droughts. In order for regional systems to be maximally effective, legislative constraints against interbasin transfers of waters would have to be relaxed. Unquestioned legislative constraints bias our thinking and preclude due consideration of regiional systems which may be in the public interest.

(4) **Water Reuse.** Reuse of water has become a viable alternative with recent advances in technology, even though only on a small scale and at high cost if for domestic consumption. Reuse of treated wastewaters for industrial process water is now a fact in the Wabash River basin. We fully expect the reclamation and reuse of wastewaters for both domestic and industrial use to become more attractive in water-short areas prior to 2020. However, water reuse was not contemplated as one of the water supply alternatives in the Wabash River basin through the period of study. Later in the century, the use of reclaimed wastewaters may become more attractive as some areas approach the end to an inexpensive supply. Until that time, there is merit in developing the more inexpensive sources, both because they are economical and because their use keeps open all options for water supply. Water reuse then will provide for adequate supply far beyond the study period. Adequate health safeguards including fail-safe systems also pose a restriction on domestic water reuse.

(5) **Summary.** A summary of the specific alternatives considered for each subbasin is presented in table C–37.

### b. Water Quality Control

The alternatives considered here consist of those methods which could contribute to meeting the established water quality standards. The specific measures are listed below.

(1) **Advanced Waste Treatment.** As used in our deliberations, normal waste treatment was defined as primary and secondary treatment plus chlorination of the effluent. These processes were projected to effect a 90 percent BOD removal plus other beneficial effects. When such normal waste treatment would not result in meeting the water quality standards of the receiving stream advanced waste treatment measures were considered. This additional treatment was nomenclatured as 95 percent, 97 percent, and 98

TABLE C–37. WATER SUPPLY FORMULATION CONSIDERATIONS
(For localities with supplies of 1,000,000 gallons/day or more in 1970)

| Area | Additional needs 1980 (mgd) | Additional needs 2020 (mgd) | Remarks |
|---|---|---|---|
| PATOKA SUBBASIN | | | |
| Jasper | 0.2 | 5.2 | To be obtained from Patoka Reservoir. |
| Huntingburg | 0.2 | 1.8 | Small watershed project provides least cost alternative. |
| Princeton | 0.2 | 4.0 | Least cost alternative provided by ground water west of city. |
| EAST FORK WHITE SUBBASIN | | | |
| New Castle | — | 10.1 | 9.6 mgd developable from ground water and stream flow; SCS project on Big Blue can provide remainder through 2020. |
| Shelbyville | — | 5.5 | Additional supplies to be furnished by ground water. |
| Greenfield | — | 6.2 | Develop ground water as needed southward, toward Big Blue River. |
| Edinburg | — | 2.3 | Least cost alternative is development of ground water. |
| Franklin | — | 4.3 | Least cost alternative is development of ground water. |
| Columbus | 6.1 | 30.7 | Needs can be met by ground water and stream flow. |
| Greensburg | — | 2.6 | Least cost alternative is to develop ground water and withdrawals from Downeyville Reservoir. |
| Vernon and North Vernon | — | 2.0 | Least cost alternative provided by SCS Vernon Fork project. |
| Bloomington | — | 14.7 | Can be met from storage in Monroe Reservoir. |
| Monroe County | 0.5 | 2.3 | Least cost alternative is development of local impoundments. |
| WEST FORK WHITE SUBBASIN | | | |
| Winchester | 0.6 | 5.3 | Least cost alternative is development of ground water and utilizing storage in Parker Reservoir near 2020. |

TABLE C-37. WATER SUPPLY FORMULATION CONSIDERATIONS (CONTINUED)
(For localities with supplies of 1,000,000 gallons/day or more in 1970)

| Area | Additional needs 1980 | Additional needs 2020 | Remarks |
|---|---|---|---|
| | (mgd) | | |
| **WEST FORK WHITE SUBBASIN (CONTINUED)** | | | |
| Mt. Summit | 0.2 | 0.8 | Ground water provides least cost alternative. |
| Muncie | 2.8 | 39.2 | Least cost alternatives include pumping from White River to Prairie Creek Reservoir development of additional ground water and utilization of 30 mgd from Parker Reservoir by 2020. |
| Fortville | — | 0.3 | Development of ground water is least cost alternative. |
| Anderson | — | 21.3 | Least cost alternatives are development of additional ground water with needs beyond 1985 met by Parker Reservoir. |
| Alexandria | 0.3 | 3.3 | Additional well fields seen as least cost alternative. |
| Elwood | 0.3 | 4.8 | Additional well fields seen as least cost alternative with possible future withdrawals White River. |
| Tipton | — | 0.8 | Additional ground water least cost alternative. |
| Noblesville | – | 0.6 | Additional ground water least cost alternative. |
| Indianapolis | 14.0 | 200.0 | Least cost alternative is development of additional ground water sources to 1980; after 1980, needs to be met by ground water and Fall Creek Parker, Big Walnut and Big Blue Reservoirs. |
| Brownsburg | — | 2.0 | Continued development ground water is least cost alternative. |
| Plainfield | — | 2.3 | Continued development ground water is least cost alternative. |
| Danville | — | 0.2 | Continued development ground water is least cost alternative. |
| Mooresville | — | 0.5 | Develop ground water as least cost alternative. |
| Martinsville | — | 2.7 | Develop ground water as least cost alternative. |
| Greencastle | — | 8.8 | Develop ground water as least cost alternative. |
| Brazil | — | 3.1 | Develop ground water as least cost alternative. |
| Linton | — | 0.8 | Develop ground water as least cost alternative. |
| Washington | — | 1.8 | Develop ground water as least cost alternative. |
| Bicknell | — | 0.4 | Develop ground water as least cost alternative. |
| **UPPER WABASH SUBBASIN** | | | |
| Huntington | — | 3.7 | Develop ground water as least cost alternative. |
| Bluffton | — | 1.2 | Develop ground water as least cost alternative. |
| Portland | 0.05 | 4.8 | Develop ground water as least cost alternative. |
| Union City | — | 3.4 | Develop ground water as least cost alternative. |

TABLE C-37. WATER SUPPLY FORMULATION CONSIDERATIONS (CONTINUED)
(For localities with supplies of 1,000,000 gallons/day or more in 1970)

| Area | Additional needs 1980 | Additional needs 2020 | Remarks |
|---|---|---|---|
| | (mgd) | | |
| UPPER WABASH SUBBASIN (CONTINUED) | | | |
| Hartford City | 1.5 | 9.4 | Develop ground water as least cost alternative. |
| Marion | --- | 13.5 | Develop ground water as least cost alternative. |
| Wabash | --- | 8.0 | Develop ground water as least cost alternative. |
| North Manchester | --- | 0.5 | Develop ground water as least cost alternative. |
| Warsaw | --- | 6.6 | Develop ground water as least cost alternative. |
| Columbia City | --- | 2.4 | Develop ground water as least cost alternative. |
| South Whitley | --- | 0.8 | Develop ground water as least cost alternative. |
| Peru | --- | 4.3 | Develop ground water as least cost alternative. |
| Rochester | --- | 0.7 | Develop ground water as least cost alternative. |
| Winamac | --- | 2.3 | Develop ground water as least cost alternative. |
| Kokomo | 20.6 | 72.3 | Least cost alternative in continued development of ground water, reuse of industrial water, possible withdrawals from Mississinewa Reservoir and possible utilization of storage in Pipe Creek Reservoir. |
| Frankfort | --- | 0.9 | Least cost alternative is continued development of ground water. |
| Monticello | --- | 1.1 | Least cost alternative is continued development of ground water. |
| Lafayette | --- | 41.6 | Least cost alternative is ground water development and stream flows. |
| Flora | --- | 0.2 | Least cost alternative is ground water development and stream flows. |
| Delphi | --- | 0.1 | Least cost alternative is ground water development and stream flows. |
| MIDDLE WABASH SUBBASIN | | | |
| Lebanon | --- | 0.4 | Least cost alternative is development of ground water. |
| Fowler | --- | 0.6 | Least cost alternative is development of ground water. |
| Rural Warren County Industry | 3.6 | 31.0 | Least cost alternative is development of ground water. |
| Attica | 0.1 | 2.8 | Least cost alternative is development of ground water. |
| Crawfordsville | 2.5 | 15.3 | Development of ground water is least cost alternative with later withdrawals from surface water impoundments and stream flow. Early action Crawfordsville Reservoir available for future supply. |
| Rockville | --- | 0.4 | Least cost alternative is to develop ground water. |
| Rural Vermilion County Industry | --- | 20.1 | Least cost alternative is to develop ground water. |

TABLE C–37. WATER SUPPLY FORMULATION CONSIDERATIONS (CONTINUED)
(For localities with supplies of 1,000,000 gallons/day or more in 1970)

| Area | Additional needs 1980 (mgd) | Additional needs 2020 (mgd) | Remarks |
|---|---|---|---|
| MIDDLE WABASH SUBBASIN (CONTINUED) | | | |
| Terre Haute Area | 12.2 | 95.7 | Development of ground water is least cost alternative with withdrawals from Wabash furnishing bulk of supply by 2020. |
| Sullivan | — | 0.7 | Least cost alternative is to develop ground water. |
| Vincennes | — | 13.3 | Least cost alternative is to develop ground water. |
| Hoopeston | 0.6 | 4.2 | Development of ground water is least cost alternative. |
| Rossville | — | 0.4 | Development of ground water is least cost alternative. |
| Danville | 8.4 | 35.8 | State plans to build reservoir of 30 mgd capacity in near future. Later needs to be met by ground water development. |
| Georgetown | 0.1 | 1.5 | Least cost alternative likely to be development of surface water impoundment or develop source away from local area, possibly from State Reservoir near Danville. |
| Rantoul | — | 1.2 | Development of ground water is least cost alternative. |
| Urbana-Champaign | — | 9.5 | Development of ground water is least cost alternative. |
| Remainder of Champaign County | — | 0.22 | Development of ground water is least cost alternative. |
| Marshall | — | 4.5 | Development of ground water is least cost alternative. |
| Robinson | 2.1 | 9.4 | Development of ground water is least cost alternative. |
| Paris | 2.4 | 7.3 | Development of impoundment on Sugar Creek in conjunction with needed water quality control storage is least cost alternative |
| EMBARRAS SUBBASIN [1] | | | |
| Lawrenceville | — | 0.4 | Development ground water as least cost alternative. |
| Newton | — | 0.28 | Least cost alternative for future supply likely to be stream flow releases from Lincoln Reservoir. |
| LITTLE WABASH SUBBASIN | | | |
| Mattoon | — | 3.8 | Least cost alternative is purchase of water from SCS project. |
| Olney | — | 2.4 | City is presently developing water supply reservoir on East Fork of Fox River which will meet needs through study period. |
| Fairfield | — | 2.9 | Least cost alternative is utilization of storage in authorized Lincoln Reservoir. |

1/ Cities of Charleston, Arcola and Casey have present supplies of less than one mgd. Charleston presently uses 1.4 mgd and is planning for additional supply from the authorized Lincoln Reservoir to meet future needs. Arcola and Casey must develop new sources or obtain water outside of local area.

percent treatment which is premised on the BOD removal parameter and does not indicate the other parameters inherent in the processes achieving the indicated degree of BOD removal. This alternative is considered applicable only to collectable pollutants and other methods which need to be considered for uncollected pollutants.

(2) **Flow Augmentation.** Flow augmentation was considered as an alternative to advanced waste treatment but only after adequate treatment at the source (secondary treatment plus chlorination of the effluent). We did not consider flow augmentation as a viable substitute for treatment at the source or point of waste discharge into the water course. Flow augmentation was considered and costed as an alternate to advanced waste treatment and in combination with various degress of treatment. We were concerned with achieving the least costly means of meeting water quality standards by either a single alternative or a combination of alternatives. In general, it was found that flow augmentation was most efficient only when it would contribute to meeting the standards for more than one community.

(3) **Dilution.** Dilution was considered as a means of meeting water quality standards only when the pollutants to be diluted are relatively uncollectable. We concluded that dilution was viable for agricultural pollutants such as nutrients and dissolved solids which wind their way into the water courses even though maximum effort has been effected at the source to prevent their induction ito the water course. Dilution of water would need to be provided from storage structures or from ground water sources.

(4) **Regional Systems.** In many instances Regional Treatment Plants can be effective in providing the quality of desired stream flows in an economically efficient manner. A number of small communities may convert or combine with larger communities to provide advanced treatment more efficiently than they could acting independently after some degree of treatment has been provided at the point or near the point of collection. Small communities often lack the financial resources to construct and efficiently operate sophisticated treatment plants that are required to meet water quality standards. Regional waste water treatment systems operating in harmony with regional water supply systems have the potential of providing a total regional water management system.

c. **Flood Damage Reduction**

Flood damage reduction is applicable both to existing developments and land use as well as to those future developments on flood plain lands. There were three types of structures which were considered as alternatives for control of flood damages where they would occur.

(1) **Channel Development.** Channel development increases an existing water course's capacity to convey a given quantity of flow with a lesser amount of energy required to convey this flow. Consequently the flood heights are reduced in the area where the channel capacity has been increased. Channel development is most effective for smaller channels (streams) where damaging flood frequencies are low, and where provision of high degrees of protection is not efficient. Channel development is often compatible with storage development. Proper planning, design and construction of channel improvement will minimize any conflict with environmental objectives.

(2) **Protective Measures.** Protective measures such as levees and floodwalls may be used to serve as a physical barrier to keep overflows from the water course from entering floodwater damageable areas. The use of protective measures is most efficiently used along larger water courses and where the value of the area to be protected is very high.

TABLE C–38. DISCUSSION OF WATER QUALITY ALTERNATIVES FOR MAJOR COMMUNITIES

| Problem area | Remarks |
|---|---|
| **PATOKA SUBBASIN** | |
| Jasper | Secondary treatment and effluent disinfection plus flows augmented from Patoka Reservoir. |
| Huntingburg | Secondary treatment and effluent disinfection plus flows augmented from Patoka Reservoir. |
| Princeton | Secondary treatment and effluent disinfection, plus piping treated wastewaters to the Patoka River, taking advantage of flows augmented from Patoka Reservoir. |
| **EAST FORK WHITE** | |
| Greenfield | Advance waste treatment needed. |
| Bloomington (South Plant) | Has installed lagoon for additional treatment. |
| New Castle | With availability of SCS structures, secondary treatment and phosphate removal should be adequate through 1980. Facilities for 95 percent BOD removal until 2010. Advanced treatmend needed by 2010. |
| Shelbyville | Flows from Big Blue Reservoir would be adequate. |
| Franklin | Transport waste waters to Sugar Creek as well as Youngs Creek until about 1985, then wastes transported to Big Blue River. |
| Rushville | Advance waste treatment with phosphate removal. |
| Columbus | Releases from Big Blue, Downeyville and Clifty Creek Reservoirs and waste water returns upstream estimated adequate. |
| Greensburg | Advance waste treatment and phosphorus removal needed. |
| Mitchell | Piping treated and disinfected waste waters four miles down Rock Lick Branch to East Fork White River. |
| Vernon-North Vernon | Effluents can be transported below mouth South Fork Vernon Fork to take advantage of storage potential of Otter Creek Reservoir. |
| Austin-Scottsburg | Advanced waste treatment needed. |
| Paoli, French Lick, West Baden | Flows in Lick Creek from three planned reservoirs adequate to about 2000; then advance waste treatment needed at Paoli. |
| Loogootee | Transport waste waters to mouth of Friends Creek at East Fork White River |
| Whiteland and New Whiteland | Advanced waste treatment in a combined plant. |
| **WHITE RIVER AND WEST FORK WHITE** | |
| Winchester | Advanced treatment needed. |
| Elwood | Advanced treatment needed. |
| Tipton | Advanced treatment needed. |
| Brazil | Advanced treatment needed. |
| Pendleton | Advanced treatment needed. |
| Linton | Advanced treatment needed. |

TABLE C–38. DISCUSSION OF WATER QUALITY ALTERNATIVES FOR MAJOR COMMUNITIES (CONTINUED)

| Problem area | Remarks |
|---|---|
| **WHITE RIVER AND WEST FORK WHITE (CONTINUED)** | |
| Bloomington (Plant No. 2) | Advanced treatment needed. |
| Alexandria | Develop storage in SCS structure 82-I-A on Pipe Creek. |
| Muncie-Anderson-Indianapolis | 95 to 97 percent BOD removal plus 90 cfs guaranteed low flow at Muncie; 95 to 97 percent BOD removal at Anderson and 97 percent BOD removal in the Indianapolis area with 50 cfs guaranteed low flow at mouth of Fall Creek, totalling a guaranteed low flow at Morris Street of 180 cfs. |
| Brownsburg-Plainfield-Mooresville | Flow from SCS project 60-VII on White Lick Creek. Brownsburg must pipe treated wastewaters below the dam. |
| Danville | Low flow releases from SCS project 60-IX until 1980, then advanced treatment needed. |
| Greencastle | Guaranteed low flow of 19 cfs from Big Walnut Creek Reservoir. |
| Bicknell-Washington-Petersburg | Transportation of waste waters to West Fork White River – optional AWT. |
| **UPPER WABASH RIVER** | |
| Celina, Ohio | Advanced waste treatment needed. |
| Dunkirk, Indiana | Advanced waste treatment needed. |
| Fairmount-Jonesboro-Gas City | Advanced waste treatment needed – costs can be minimized by adopting regional system. |
| Frankfort, Indiana | Advanced waste treatment needed. |
| Kokomo, Indiana | Advanced waste treatment needed. |
| Marion | Advanced waste treatment needed. |
| Portland | Advanced waste treatment needed. |
| Union City | Advanced waste treatment needed. |
| Montpelier | Advanced waste treatment needed. |
| Hartford City | Advanced waste treatment needed. |
| Grissom Air Force Base | Advanced waste treatment needed. |
| Warsaw-Winona Lake | Advanced waste treatment needed – costs can be reduced by a combined system. |
| Coldwater, Ohio | Pipe treated waste waters to Little Beaver Creek and augment low flows from SCS project 17-H. |
| Bluffton | Secondary treatment, disinfection and nutrient removal with augmentation of low flows from SCS reservoirs on Little Beaver Creek and Limberlost Creek. |
| Huntington | Augmentation of low flow from SCS reservoir projects on Little River, Little Beaver Creek and Limberlost Creek. |
| Wabash-Lagro | Low flow augmentation from reservoirs. |
| Peru | Low flow augmentation from reservoirs. |
| Columbia City | Pipe treated effluents to Eel River and add advanced waste treatment after 2000. |

TABLE C–38. DISCUSSION OF WATER QUALITY ALTERNATIVES FOR MAJOR COMMUNITIES (CONTINUED)

| Problem area | Remarks |
|---|---|
| **UPPER WABASH RIVER (CONTINUED)** | |
| Rochester | Add nutrient removal facilities. |
| Lafayette-West Lafayette | Secondary treatment with flow augmentation from all proposed upstream reservoirs involving releases from Lafayette Reservoir. |
| **MIDDLE WABASH RIVER** | |
| Lebanon, Indiana | Advanced waste treatment needed. |
| Paxton, Illinois | Advanced waste treatment needed. |
| Georgetown, Illinois | Advanced waste treatment needed. |
| Sullivan, Indiana | Advanced waste treatment needed. |
| Hoopeston, Illinois | Advanced waste treatment needed. |
| Robinson, Illinois | Advanced waste treatment needed. |
| Champaign-Urbana, Illinois | Advanced treatment with combined system. |
| Rantoul-Chanute Air Force Base | Advanced treatment with combined system. |
| Danville, Illinois | Advanced waste treatment needed. |
| Crawfordsville, Indiana | AWT with alternative provided by Crawfordsville Reservoir. |
| *Rockville, Indiana* | Pipe effluents to Big Raccoon Creek |
| Terre Haute, Indiana | Secondary treatment and disinfection adequate until 1980, advanced waste treatment could be necessary by 2000. |
| Paris, Illinois | Using storage from SCS structure 44-I on Sugar Creek until 1980, then providing 95% BOD removal. |
| Marshall, Illinois | Pipe effluents seven miles to Wabash River. |
| **EMBARRAS RIVER** | |
| Tuscola | Advanced waste treatment needed. |
| Charleston | Advanced waste treatment needed. |
| Mattoon | Advanced waste treatment needed. |
| Newton | Discharge to Embarras River in conjunction with releases from Lincoln Reservoir adequate. |
| **LITTLE WABASH RIVER** | |
| Effingham | Secondary treatment phosphorus removal, and piping effluents to the Little Wabash River. |
| Flora | Piping waste waters to the Little Wabash River with flow releases from Louisville Reservoir. |
| Olney | 90 percent BOD removal with flows from SCS reservoir 39-IX. |
| Fairfield | Piping waste waters to Little Wabash River with releases from Louisville Reservoir. |
| Albion | Piping waste waters to the Wabash River below Grayville. |
| Carmi | 90 percent BOD removal, augmenting flow from Helm and Louisville Reservoir. |

TABLE C–38. DISCUSSION OF WATER QUALITY ALTERNATIVES FOR MAJOR COMMUNITIES (CONTINUED)

| Problem area | Remarks |
|---|---|
| LITTLE WABASH RIVER (CONTINUED) | |
| Wayne City | Maintain flow of at least 20 cfs in Skillet Fork, augmenting flows with releases from Helm Reservoir |
| LOWER WABASH RIVER | |
| None | |

1/ In every case, a minimum of secondary waste treatment giving 90 percent BOD removal, plus effluent disinfection, is presupposed as a condition to further remarks.

**(3) Storage Structures.** Storage structures such as lakes, ponds, and reservoirs are useful in holding peak flood flows until they can be accommodated by the downstream water courses. Storage structures have a beneficial flood reduction effect for all areas downstream from them whereas the beneficial effects of protective measures and channel development are contiguous to or just upstream from the area of construction. Storage structures tend to optimize economic efficiency by being adaptable for multiple uses with usually lower added costs. For any water resource system the multiple purpose storage structures must always serve as the hub or nucleus of such a system. The big public question relates to the size of such structures. There is no generally applicable answer to such questions for each structure or combination of such structures needs to be sized to meet the specific problem area for which they are applicable.

## 22. NON–STRUCTURAL MODIFICATIONS

For many of the indicated needs, non-structural modifications may either take care of the need or some part of the need. In many cases needed damage reduction can be effected with nominal or little economic costs but the institutional costs may be high. However, in all cases, the subcommittee tried to use non-structural modification before applying structural modifications. Those non-structural modifications considered and their areas of application are as follows.

### a. Flood Plain Management

Irrespective of how many reservoirs, levees, and channel development projects are built, it is clear that the annual flood damages will continue to rise unless institutional constraints and incentives are provided to prevent further development within the flood plain. The problem lies not in knowing what to do but more in how to do it in consonance with the "due process" clause in the Constitution and in consonance with the property rights of citizens.

### b. Environmental Corridors

Environmental corridors have been called many things such as scenic streams and green belts. We prefer the broader connotation of "environmental corridors". These corridors in public ownership and/or management would tend to reduce flood damages by precluding subsequent development within the flood plain; would provide for spiritual enrichment of the public by preserving the best of the remaining streams and stream banks for use and enjoyment of present and future generations; and would "red flag" these areas for various uses consistent with good land use planning. There are two types of "environmental corridors", namely rural corridors and urban corridors. The rural corridors represent the best remaining vestiges of the historic stream cultures of the basin. The urban corridors represent the stream cultures that are easily accessible to the mass of the environmentally and often times economically deprived public. Environmental corridors in rural areas are intended to maintain a status quo on clearing and extending of agricultural pursuits onto existing relatively undisturbed environment. Scenic easements would be employed to the maximum extent practicable with fee acquisition limited only to those areas (parking, access, etc) necessary to assure public usability. It is not anticipated that riparian rights of contiguous land owners would be abridged without due compensation. The administration or stewardship of such corridors would be vested in non-Federal jurisdictions except in those rare instances, if any exist, where they are of such national interest that Federal stewardship is necessary or they are an integral part of a Federal project. Urban corridors on the other hand are intended to reconstruct a viable stream environment to one that has been deteriorated from human abuse. The urban corridors are expected to provide a segment of long range plan for urban reconstruction, or arresting of further degradation of urban quality. This should provide a central thrust in urban communities for application of Federal and non–Federal funds toward a long range objective. The objective here is clear – to provide for the highest and best use of flood prone lands and to minimize further encroachments onto flood plains and relocate existing developments outside of the flood plain as relocation or renovation of existing developments takes place.

### c. Land Treatment

Land treatment, consisting of adjustments in cropping patterns, changed land use, reforestation, etc., has the potential for some reduction in flood damages, pollution abatement and conservation of the present and future productive capability of the land. Land treatment as we have traditionally thought of it has been related to short term increased productivity as well as long term preservation of the productive capability. The latter is of greater concern in planning for the basin and accordingly has been accorded the higher priority of the two. Additionally, high priority has been accorded to adequate treatment of those lands which are necessary to preserve and extend the functional life of water resource projects and to those lands which are deteriorating so rapidly at present that they require early remedial action or they will lose their resource viability.

## TABLE C–39. SUMMARY OF ALTERNATIVE PROJECTS CONSIDERED BY SUBBASIN

### MAJOR RESERVOIR PROJECTS

| Reservoir | Stream |
|---|---|
| **Patoka River** | |
| Winslow | Patoka River |
| Flat Creek | Flat Creek |
| **East Fork White River** | |
| Millport | Muscatatuck River |
| Shoals | East Fork White River |
| Vernon Fork | Vernon Fork |
| **West Fork White River** | |
| Bean Blossom | Bean Blossom Creek |
| Fortville | Fall Creek |
| Frankton | Pipe Creek |
| Perkinsville | West Fork White River |
| Killbuck | Killbuck Creek |
| Spencer | West Fork White River |
| Boy Scout | Fall Creek |
| Mooresville | Whitelick Creek |
| Richland | Richland Creek |
| **Upper Wabash River** | |
| Tippecanoe | Tippecanoe River |
| *Delphi* | *Wabash River* |
| Petes Run | Wildcat Creek |
| **Middle Wabash River** | |
| Big Creek | Big Creek |
| Brouilletts | Brouilletts Creek |
| **Middle Wabash River (Continued)** | |
| Danville | Vermilion River |
| Kickapoo | Middle Fork Vermilion |
| Little Vermilion | Little Vermilion |
| Mill Creek | Mill Creek |
| Montezuma | Wabash River |
| North Fork Vermilion | North Fork Vermilion |
| Sugar Creek | Sugar Creek |
| Sugar Mill Creek | Sugar Mill Creek |
| **Embarras River** | |
| North Fork Embarras | North Fork Embarras |
| Woodbury | Muddy Creek |
| Crooked Creek | Crooked Creek |
| **Little Wabash River** | |
| Elm River | Elm River |
| Wilcox Bridge | Little Wabash River |
| Big Muddy | Weather-Big Muddy Creek |
| Effingham | Little Wabash River |
| Fox River | Fox River |
| *Horse Creek* | Horse Creek |
| Brush Creek | Brush Creek |
| **Lower Wabash River** | |
| Bonpas | Bonpas Creek |

### SMALL WATERSHED PROJECTS

| Hydrologic subbasin and type | Potential number of sites |
|---|---|
| **Patoka River** | |
| Multiple-purpose | 91 |
| Single purpose (FP or WS) | 4 |
| Single purpose (WS only) | 1 |
| **East Fork White River** | |
| Multiple-purpose | 199 |
| Single purpose (FP or WS) | 35 |
| Single purpose (WS only) | 27 |
| **West Fork White River** | |
| Multiple-purpose | 260 |
| Single purpose (FP or WS) | 34 |
| Single purpose (WS only) | 9 |
| **Upper Wabash River** | |
| Multiple-purpose | 27 |
| Single purpose (FP or WS) | 18 |
| Single purpose (WS only) | 18 |
| **Middle Wabash River** | |
| Multiple-purpose | 109 |
| Single purpose (FP or WS) | 35 |
| Single purpose (WS only) | 51 |
| **Embarras River** | |
| Multiple-purpose | 57 |
| Single purpose (FP or WS) | 43 |
| Single purpose (WS only) | 7 |
| **Little Wabash River** | |
| Multiple-purpose | 88 |
| Single purpose (FP or WS) | 64 |
| Single purpose (WS only) | 15 |
| **Lower Wabash River** | |
| Multiple-purpose | 25 |
| Single purpose (FP or WS) | 4 |
| Single purpose (WS only) | — |

## SECTION V – DEVELOPMENT OF NATIONAL INCOME EFFICIENCY PLAN

### 23. GENERAL METHODOLOGY

In developing the National Income Efficiency Plan several basic procedural criteria were used. These criteria include:

**a.** Project proposals were developed by several agencies in accord with their particular expertise.

**b.** Potential projects were compared with identified needs to determine which project or combination of projects could most efficiently meet the needs.

**c.** Maximum net returns on investments provided the basis for plan element selections except where the maximum net return required a substantially higher investment than the next best maximum net return combination.

**d.** Uniform interest rates were assumed for all investments. In determining the most efficient means of meeting needs, the selection of the best array of resource development is independent of the interest rate. However, the interest rate becomes of prime importance in determining when to proceed with a program.

### 24. SPECIFIC METHODOLOGY

In formulating the National Income Efficiency Plan, the Plan Formulation Subcommittee used a method which we shall call "progressive summation" for lack of a better term. Progressive summation simply means finding that project, or least combination of projects, which will meet the greatest number of needs. For example, if we let:

X,Y,Z each represent some need and A,B,C each be a project that can meet one or more of the needs:


Since A can satisfy X, Y, Z and B can satisfy Y, Z and C can satisfy X, we concluded that A was the most efficient way of satisfying X, Y, and Z; unless we found some other means of more efficiently satisfying X, Y, and Z. Then we looked at the incremental cost of meeting each of X, Y, and Z after meeting the other two.

Thus, we arrived at one economical solution for which each purpose was justified and thus exhibited an investment return of greater than unity.

When two or more solutions meet this criteria we applied the criteria of comparative efficiency. In comparative efficiency we compared: (a) net benefits (sum of annual benefits less sum of annual charges and (b) size of investment necessary to obtain net benefits. As an example; if we found that the net benefits for A were slightly more than for B and the cost of A was considerably more than B, we would select B.

## 25. SPECIAL STUDY CONSIDERATIONS OF THE NATIONAL INCOME EFFICIENCY PLAN

### a. Grand Lake, Ohio

After consideration of the water and related land resources of Grand Lake, the Plan Formulation Subcommittee concluded that the determination of a solution would be well beyond the scope and resources of the current Wabash Comprehensive. The water resource problems in the Grand Lake - St. Marys, Ohio, area including those of an institutional nature, were considered to be of such a scope and nature that no particular solution was readily apparent. The Plan Formulation Subcommittee recommends that a detailed full survey scope study be undertaken to determine what feasible measures can be undertaken to restore and enhance Grand Lake and its tributary and related area as a viable natural resource. Subsequently, the Flood Control Act of 1970 has directed the Corps of Engineers to make such a study.

### b. South Fork Patoka River

That portion of the Patoka River and its tributaries located mostly in Pike County, Indiana, are degraded by concentrations of iron, sulfate, manganese, acidity and coal fines. In particular, the South Fork Patoka River is severely polluted by mine drainage. Improperly reclaimed surface mines, coal refuse piles, slurry areas, and haul roads constructed of pyritic refuse materials are the sources of most of the mine drainage problems. The most significant is a 22.5 square mile area of the South Fork Patoka River watershed. Reclamation of this area, involving about 4,000 acres of extensive corrective work, would eliminate a major mine drainage pollution source in the Wabash Basin. Accordingly, the Plan Formulation Subcommittee recommends undertaking a demonstration mine reclamation project for principal polluting areas of the South Fork Patoka River, a high priority item of the early action plan.

c. That portion of the Busseron Creek and its tributaries located mainly in Sullivan County are degraded from drainage from improperly reclaimed surface mined areas. The majority of the most serious mine drainage problems are located in an area of about three square miles which drain into Mud Creek, Sulfur Creek and Buttermilk Creek, tributaries to Busseron Creek, having a combined drainage area of about 47 square miles, of which a little over eight has been surface mined. Accordingly, the Plan Formulation Subcommittee recommends undertaking a demonstration mine reclamation project for principal polluting areas of the Busseron Creek.

## 26. APPLICATION OF METHODOLOGY – STRUCTURAL ELEMENT

All projects in the Early Action phase of the Comprehensive Program have been studied in detail commensurate with that which is required for Type II studies. Selection of the projects presented herein as elements of the overall phase of development has been based on a prudent and sytematic analysis. Each project has been investigated for its ability to meet the demands imposed upon it at present and the expected demands the project may be required to fulfill in future years, either alone or in combination with other projects and programs on a regulated, systematic basis to insure the fullest economic efficiency of the Comprehensive Plan.

A summary of the major projects studied in the Wabash Basin for this report, their purposes and capabilities for meeting those purposes as developed by the general and specific methodologies outlined in paragraph 24, are contained in tables C–40 through C–47.

## TABLE C–40.PATOKA SUBBASIN

| Project number | Project name | Location mileage code | Description | Purpose and benefits ($1,000) | | Total benefits ($1,000) | Annual charges ($1,000) | B/C ratio to 1.0 | Net benefits ($1,000) | Selected plan 1/ | Reason for selecting or rejecting 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Winslow Reservoir | 95-42 | DA=603 | FC | 167 | 1,517 | 1,415 | 1.1 | 102 | Rejected | Low B/C Ratio for FC |
| | | | | Rec | 1,250 | | | | | | |
| | | | | F&W | 100 | | | | | | |
| | Maltersville Reservoir | 95-81-3 | DA=62 | FC | 183 | 568 | 559 | 1.0 | 9 | LR | Provides FC & Rec for long range needs. |
| | | | | Rec | 337 | | | | | | |
| | | | | F&W | 48 | | | | | | |
| | Flat Creek Reservoir | 95-62-2 | DA=56 | FC | 85 | 485 | 475 | 1.0 | 10 | Rejected | Low B/C ratio for FC |
| | | | | Rec | 350 | | | | | | |
| | | | | F&W | 50 | | | | | | |
| | Levee Unit 2 (Agricultural) | 95-25 to 28R | 3.3 miles | FC | 71 | 71 | 29 | 2.5 | 42 | EA | Protects high yielding agric. land |
| | Levee Unit 3 (Agricultural) | 95-26 to 30L | 6.6 miles | FC | 48 | 48 | 32 | 1.5 | 16 | EA | Protects high yielding agric. land |
| | Levee Unit 4 (Agricultural) | 95-29 to 32R | 4.0 miles | FC | 52 | 52 | 24 | 2.2 | 28 | EA | Protects high yielding agric. land |
| | Levee Unit 5 (Agricultural) | 95-32 to 33L | 2.7 miles | FC | 15 | 15 | 14 | 1.1 | 1 | EA | Protects high yielding agric. land |
| | Levee Unit 6 (Agricultural) | 95-34 to 35R | 1.3 miles | FC | 9 | 9 | 11 | 0.8 | — | Rejected | Small area protected |
| | Levee Unit 7 (Agricultural) | 95-48 to 52L | 3.0 miles | FC | 12 | 12 | 24 | 0.5 | — | Rejected | Low B/C ratio |
| | Levee Unit 8 (Agricultural) | 95-68 to 70R | 1.3 miles | FC | 5 | 5 | 11 | 0.5 | — | Rejected | Low B/C ratio |
| | Levee Unit 10 (Agricultural) | 95-78-80R | 1.7 miles | FC | 13 | 13 | 13 | 1.0 | — | Rejected | Small area protected |
| | Patoka River Diversion Channel | 95-88 | 6.4 miles | Data | Not | Presently | Available | | | Rejected | Low B/C ratio, hyd. & legal problems |
| | Patoka River Channel Improvement | 95-0-36 | 35.5 miles | FC | 495 | 495 | 330 | 1.5 | 165 | EA | Provides more efficient disch. capacity |
| | Hunley-Ell Creeks Watershed | 95-77-0 | 8 Structures | FC | 100 | 423 | 308 | 1.4 | 115 | EA | Provides FC benefits to 6300A + WS, WQ |
| | | | 2 WS | Rec | 126 | | | | | | |
| | | | 2 WQ | WQ | 57 | | | | | | |
| | | | 2 Rec | WS | 55 | | | | | | |
| | | | | Other | 84 | | | | | | |
| | Hall-Falt Creeks Watershed | 95-81-3 | 8 Structures | FC | 106 | 242 | 186 | 1.3 | 56 | EA | FC benefits for 3100A + WS, WQ |
| | | | 2 WS | Rec | 75 | | | | | | |
| | | | 1 WQ | WQ | 6 | | | | | | |
| | | | 1 Rec | WS | 2 | | | | | | |
| | | | | Other | 53 | | | | | | |
| | Upper Patoka Tribs Watershed | 95-118 | 5 Structures | FC | 30 | 38 | 30 | 1.2 | 8 | EA | WS for Hillman, FC benefits for 1000A |
| | | | 1 WS | WQ | 1 | | | | | | |
| | | | 1 WQ | WS | 1 | | | | | | |
| | | | | Other | 6 | | | | | | |
| | Flat Creek Watershed | 95-62-0 | 1 Structure | FC | 6 | 13 | 6 | 2.1 | 7 | LR | Provides FC, was for long range needs |
| | | | 1 WS | WS | 6 | | | | | | |
| | | | | Other | 1 | | | | | | |
| | Cup Creek Watershed | 95-54-0 | 2 Structures | FC | 9 | 72 | 38 | 1.9 | 34 | LR | Provides FC, WS & Rec |
| | | | 1 Rec | Rec | 50 | | | | | | |
| | | | 1 WS | WS | 6 | | | | | | |
| | | | | Other | 7 | | | | | | |
| | Plus 26 Non-feasible Watersheds | | | | | | | | | | |

1/ Early Action projects in the National Income Efficiency Plan were selected by the process of progressive summation. This technique is discussed in Section V, page 63, under Specific Methodology.

## TABLE C-41 EAST FORK WHITE SUBBASIN

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ($1,000) | | ($1,000) | ($1,000) | | ($1,000) | | |
| | Azalia Reservoir | 96-49-175-3 | DA=250 | FC | 654 | 2,324 | 1,848 | 1.4 | 476 | EA | Reduces flood damages in White River |
| | | | | Rec | 1,620 | | | | | | |
| | | | | F&W | 50 | | | | | | |
| | Deputy Reservoir | 96-49-130-52 | DA=294 | FC | 1,224 | 2,209 | 1,805 | 1.3 | 494 | EA | Same, provides WQ for Muscatatuck |
| | | | | Rec | 522 | | | | | | |
| | | | | F&W | 30 | | | | | | |
| | | | | WQ | 523 | | | | | | |
| | Millport Reservoir | 96-49-130-4 | DA=1,129 | FC | 688 | 5,668 | 4,200 | 1.4 | 1,468 | Reject | Low B/C ratio for FC |
| | | | | Rec | 3,800 | | | | | | |
| | | | | F&W | 160 | | | | | | |
| | | | | WS | 1,220 | | | | | | |
| | Shoals Reservoir | 96-49-61 | DA=4,947 | FC | 1,020 | 6,900 | 6,185 | 1.1 | 715 | Reject | Low B/C ratio for FC |
| | | | | Rec | 5,780 | | | | | | |
| | | | | F&W | 100 | | | | | | |
| | Vernon Fork Reservoir | 96-49-130-24-27 | DA=226 | FC | 948 | 1,563 | 1,464 | 1.1 | 99 | Reject | Replaced by two watershed projects |
| | | | | Rec | 580 | | | | | | |
| | | | | F&W | 35 | | | | | | |
| | West Levee (Urban) 2/ | 96-49-239 to 244R | 6.8 miles | FC | 100 | 100 | 75 | 1.3 | 25 | EA | Protects 2,500A of mixed development |
| | Wiemeyer Levee (Urban) | 96-49-185-4L | 1.2 miles | FC | 18 | 18 | 10 | 1.8 | 8 | EA | Protects housing area |
| | Beatty Levee (Urban) 2/ | 96-49-239 to 243L | 4.6 miles | FC | 83 | 83 | 71 | 1.2 | 12 | EA | Area is suitable for industrial development |
| | Levee Unit 5 (Urban) 2/ | 96-49-236 to 240L | 4.1 miles | FC | 97 | 97 | 74 | 1.3 | 23 | EA | Agric. & commercial area |
| | Levee Unit 17 (Agricultural) | 96-49-214 to 219L | 4.3 miles | FC | 38 | 38 | 30 | 1.3 | 8 | EA | High value crop land protected |
| | Levee Unit 4 (Agricultural) | 96-49-229-234L | 6.0 miles | FC | 18 | 18 | 28 | 0.6 | – | Reject | Low B/C ratio for FC |
| | Levee Unit 15 (Agricultural) | 96-49-68 to 73L | 8.8 miles | FC | 24 | 24 | 63 | 0.4 | – | Reject | Low B/C ratio for FC |
| | Levee Unit 16 (Agricultural) | 96-49-187 to 199L | 7.3 miles | FC | 24 | 24 | 49 | 0.5 | – | Reject | Low B/C ratio for FC |
| | Aikman Creek Watershed | 96-49-5 | 4 Structures | FC | 35 | 45 | 38 | 1.2 | 7 | EA | Provides drainage for cropland |
| | | | | D | 10 | | | | | | |
| | Lost River Watershed | 96-49-35 | 11 Structures | FC | 271 | 621 | 456 | 1.4 | 165 | EA | Provides WS, FC and intensive land treatment program |
| | | | 1 WS | WS | 22 | | | | | | |
| | | | 4 Rec | Rec | 252 | | | | | | |
| | | | | Other | 76 | | | | | | |
| | Upper Vernon Fork Watershed | 96-49-130-24-37 | 5 Structures | FC | 285 | 641 | 339 | 1.6 | 302 | EA | Upper & Lower V.Fk. projects provide more benefits for affected areas than large Corps reservoir which was considered. Foundations also questionable for larger dam. |
| | | | 3 WS | WS | 106 | | | | | | |
| | | | 1 Rec | Rec | 190 | | | | | | |
| | | | | Other | 60 | | | | | | |
| | Lower Vernon Fork Watershed | 96-49-130-24-3 | 13 Structures | FC | 379 | 589 | 360 | 1.6 | 229 | EA | |
| | | | 2 Rec | D | 21 | | | | | | |
| | | | | Rec | 135 | | | | | | |
| | | | | Other | 54 | | | | | | |
| | White Creek-Beatty-Walker Watershed | 96-49-148-6 | 14 Structures | FC | 305 | 686 | 380 | 1.8 | 306 | EA | FC benefits for 14,000A |
| | | | 2 Rec | D | 33 | | | | | | |
| | | | | Rec | 278 | | | | | | |
| | | | | Other | 70 | | | | | | |

TABLE C–41 EAST FORK WHITE SUBBASIN (CONTINUED)

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ($1,000) | | ($1,000) | ($1,000) | | ($1,000) | | |
| | Lewis Creek Watershed | 96-49-190R-16 | Channel Improvement 27.5 miles | FC | 24 | 112 | 81 | 1.4 | 31 | EA | Substantial drainage improvement |
| | | | | D | 88 | | | | | | |
| | Upper Big Flatrock Creek Watershed | 96-49-190R-42 | 2 Structures | FC | 164 | 327 | 236 | 1.4 | 91 | EA | Provides land treatment & Fish-wildlife improvements and WS |
| | | | 1 WS | D | 31 | | | | | | |
| | | | 1 Rec | WS | 38 | | | | | | |
| | | | | Rec | 61 | | | | | | |
| | | | | Other | 33 | | | | | | |
| | Delaney Creek Watershed | 96-49-130-9 | 5 Structures | FC | 67 | 187 | 99 | 1.9 | 88 | EA | Provides irrigation for expanding truck farming area & recreation + WS for rural area |
| | | | 1 WS | WS | 14 | | | | | | |
| | | | 1 Rec | Rec | 82 | | | | | | |
| | | | | Other | 24 | | | | | | |
| | Pond Creek Watershed | 96-49-130-11 | 2 Structures | FC | 62 | 225 | 93 | 2.4 | 132 | EA | Substantial recreation benefits |
| | | | 1 Rec | D | 5 | | | | | | |
| | | | | Rec | 136 | | | | | | |
| | | | | Other | 22 | | | | | | |
| | Little Salt Creek Watershed | 96-49-92-20 | 3 Structures | FC | 32 | 37 | 37 | 1.0 | 0 | EA | Complements nearby Corps project |
| | | | 1 Rec | Rec | 2 | | | | | | |
| | | | | Other | 3 | | | | | | |
| | Denios Creek Watershed | 96-49-184 | 3 Structures | FC | 49 | 267 | 95 | 2.8 | 172 | EA | Recreation & FC |
| | | | 1 Rec | Rec | 193 | | | | | | |
| | | | | Other | 25 | | | | | | |
| | Brandywine Creek Watershed | 96-49-190R-15-19 | Channel Improvement 26.2 miles | FC | 156 | 172 | 88 | 2.0 | 84 | EA | Land treatment and drainage |
| | | | | D | 3 | | | | | | |
| | | | | Other | 13 | | | | | | |
| | Little Blue River Watershed | 96-49-190R-15-25 | 1 Structure | FC | 85 | 89 | 71 | 1.3 | 18 | EA | Flood damage reduction |
| | | | | Other | 4 | | | | | | |
| | Sugar and Slate Creeks Watershed | 96-49-22 and 24 | 6 Structures | FC | 24 | 177 | 81 | 2.2 | 96 | LR | Long Range projects will partially satisfy remaining FC,WS,Rec needs in Wabash Basin after implementation of early action program |
| | | | 1 Rec | Rec | 135 | | | | | | |
| | | | | Other | 18 | | | | | | |
| | Sulphur Creek Watershed | 96-49-63-5 | 1 Structure | FC | 10 | 142 | 75 | 1.9 | 67 | LR | Same |
| | | | 1 Rec | Rec | 132 | | | | | | |
| | Guthrie Creek Watershed | 96-49-101 | 3 Structures | FC | 30 | 209 | 139 | 1.5 | 70 | LR | Same |
| | | | 1 Rec | Rec | 132 | | | | | | |
| | | | 1 WS | WS | 27 | | | | | | |
| | | | | Other | 20 | | | | | | |
| | Buffalo Creek Watershed | 96-49-126 | 2 Structures | FC | 10 | 92 | 71 | 1.3 | 21 | LR | Same |
| | | | 1 Rec | Rec | 72 | | | | | | |
| | | | | Other | 10 | | | | | | |
| | McHargue Ditch Watershed | 96-49-142 | 1 Structure | FC | 12 | 16 | 8 | 1.9 | 8 | LR | Same |
| | | | | D | 2 | | | | | | |
| | | | | Other | 2 | | | | | | |
| | John Thompson Ditch Watershed | 96-49-167 | Channel Improvement 2.5 miles | FC | 17 | 18 | 9 | 1.9 | 9 | LR | Same |
| | | | | Other | 1 | | | | | | |
| | Big Slough Watershed | 96-49-190R-5 | Channel Improvement 7.3 miles | FC | 18 | 19 | 14 | 1.4 | 5 | LR | Same |
| | | | | Other | 1 | | | | | | |
| | Youngs Creek Watershed | 96-49-190R-20-5 | 2 Structures | FC | 67 | 73 | 32 | 2.3 | 41 | LR | Same |
| | | | | Other | 6 | | | | | | |
| | Bear Creek Watershed | 96-49-13 | 1 Structure | FC | 4 | 152 | 52 | 2.9 | 100 | LR | Same |
| | | | 1 Rec | Rec | 132 | | | | | | |
| | | | | Other | 16 | | | | | | |
| | Plus 43 Non-feasible Watersheds | | | | | | | | | | |

1/ Early Action projects in the National Income Efficiency Plan were selected by the process of progressive summation. This technique is discussed in Section V, page 63, under Specific Methodology.
2/ Compensary floodway modifications will be required in the East Fork White River floodway in conjunction with these projects to prevent increase flood stages in the Columbus area.

## TABLE C-42. WEST FORK WHITE SUBBASIN

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ($1,000) | ($1,000) | ($1,000) | | ($1,000) | | |
| | Bean Blossom Reservoir | 96-173-4 | DA=169 | FC | 334 | 1,284 | 1,330 | 1.0 | — | Rejected | Low B/C ratio for FC |
| | | | | Rec | 950 | | | | | | |
| | Fortville Reservoir | 96-223-26 | DA=169 | FC | 948 | 1,918 | 1,525 | 1.3 | 392 | Rejected | Alternate to Highland site |
| | | | | Rec | 970 | | | | | | |
| | Frankton Reservoir | 96-278-11 | DA-105 | Rec | 810 | 2,000 | 1,670 | 1.2 | 330 | Rejected | High relocations costs |
| | | | | WQ | 1,190 | | | | | | |
| | Perkinsville Reservoir | 96-278 | DA=711 | Rec | 1,800 | 2,326 | 1,887 | 1.2 | 439 | Rejected | Limited storage |
| | | | | WQ | 526 | | | | | | |
| | Parker Reservoir | 96-330 | DA=175 | FC | 918 | 3,928 | 2,670 | 1.5 | 1,258 | EA | Need for primary purposes of FC,WS & WQ |
| | | | | Rec | 1,610 | | | | | | |
| | | | | WQ | 1,000 | | | | | | |
| | | | | WS | 400 | | | | | | |
| | Killbuck Reservoir | 96-292-3 | DA=93 | Rec | 1,190 | 2,480 | 1,960 | 1.3 | 520 | Rejected | Limited storage |
| | | | | WQ | 1,290 | | | | | | |
| | Spencer Reservoir | 96-116 | DA=2,950 | FC | 4,000 | 7,890 | 8,900 | 0.9 | — | Rejected | Low B/C ratio |
| | | | | Rec | 3,890 | | | | | | |
| | Tail Creek Reservoir (Boy Scout Site) | 96-233-14 | DA=300 | FC | 1,084 | 6,477 | 4,860 | 1.3 | 1,617 | Rejected | Alternate to Highland site |
| | | | | Rec | 2,783 | | | | | | |
| | | | | WQ | 928 | | | | | | |
| | | | | WS | 1,682 | | | | | | |
| | Tail Creek Reservoir (Highland Site) | 96-233-17 | DA=242 | FC | 880 | 5,358 | 3,700 | 1.5 | 1,658 | EA | First priority project required for FC, WQ & WS for Indianapolis |
| | | | | Rec | 2,783 | | | | | | |
| | | | | WQ | 700 | | | | | | |
| | | | | WS | 995 | | | | | | |
| | Mooresville Reservoir | 96-200-12 | DA=210 | FC | 670 | 1,305 | 1,910 | 0.7 | — | Rejected | Low B/C ratio |
| | | | | Rec | 635 | | | | | | |
| | Richland Creek Reservoir | 96-120-1-10 | DA=88 | FC | 136 | 686 | 906 | 0.8 | — | Rejected | Low B/C ratio for FC |
| | | | | Rec | 550 | | | | | | |
| | Martinsville Reservoir | 96-206 | DA-35 | FC | 4,103 | 6,723 | 3,600 | 1.9 | 3,123 | LR | Provides major FC in White & Wabash River flood plains during long range phase |
| | | | | Rec | 2,620 | | | | | | |
| | Dunn, Harmon and Remy Levee (Urban) | 96-228 to 232 | 5.2 miles | FC | 187 | 187 | 110 | 1.7 | 87 | Rejected | Low FC benefits |
| | Landersdale Levee (Agricultural) | 96-218 to 223 | 5.0 miles | FC | 73 | 73 | 42 | 1.7 | 31 | Rejected | In Martinsville pool, low B/C ratio |
| | Levee Unit 13 (Urban-Martinsville LP) | 96-191 to 196 | 3.5 miles | FC | 191 | 191 | 44 | 4.3 | 147 | Rejected | Martinsville Reservoir reduces benefits |
| | Levee Unit 12 (Agricultural) | 96-187 to 194 | 4.7 miles | FC | 162 | 162 | 19 | 8.7 | 143 | Rejected | Martinsville Reservoir reduces benefits |
| | Levee Unit 11 A&B (Agricultural) | 96-180 to 187 | 9.2 miles | FC | 290 | 290 | 43 | 6.8 | 247 | Rejected | Martinsville Reservoir reduces benefits |
| | Levee Unit 30 (Agricultural) | 96-29 to 34 | 6.1 miles | FC | 37 | 37 | 46 | 0.8 | — | Rejected | Low B/C ratio |
| | Spencer Local Protection (Urban) | 96-165 to 166R | 2.3 miles | FC | 25 | 25 | 74 | 0.3 | — | Rejected | Low B/C ratio |
| | Fores and Atkinson Levee (Agricultural) | 96-75 to 82 | 7.3 miles | FC | 54 | 54 | 64 | 0.9 | — | Rejected | Martinsville Reservoir reduces benefits |
| | Vincent and Paddock Levee (Agricultural) | 96-217 to 221 | 3.1 miles | FC | 55 | 55 | 48 | 1.1 | — | Rejected | In Martinsville pool |
| | Veale Creek Watershed | 96-56-0 | 4 Structures 1 Rec | FC | 31 | 101 | 57 | 1.8 | 44 | EA | Benefits 1400A for FC, provides rec. |
| | | | | Rec | 60 | | | | | | |
| | | | | Other | 10 | | | | | | |

TABLE C-42. WEST FORK WHITE SUBBASIN (CONTINUED)

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ($1,000) | | ($1,000) | ($1,000) | | ($1,000) | | |
| | Black Creek Watershed | 96-85-0 | 2 Structures<br>2 WQ<br>1 Rec | FC<br>D<br>WQ<br>Rec<br>Other | 227<br>16<br>8<br>52<br>33 | 336 | 169 | 2.0 | 167 | EA | Provides wide range of benefits including flood control benefits for 9300A agricultural lands |
| | Splunge Creek Watershed | 96-135-22 | | DATA NOT PRESENTLY AVAILABLE | | | | | EA | EA | |
| | Birch Creek Watershed | 96-135-246 | 6 Structures<br>1 WQ | FC<br>WQ<br>Other | 40<br>31<br>4 | 75 | 54 | 1.4 | 21 | EA | Improves WQ in central Clay County |
| | Jordan Creek Watershed | 96-135-39 | 4 Structures<br>1 Rec | FC<br>Rec<br>Other | 24<br>103<br>15 | 142 | 93 | 1.5 | 49 | EA | Benefits 1500A flood plain |
| | Lagoon Ditch - Wabash and Erie Canal Watershed | 96-135-6&8 | Channel Improvement 21.0 miles | FC<br>Other | 101<br>7 | 108 | 38 | 2.8 | 70 | EA | Provides drainage for 4540A |
| | Croys Creek Watershed | 96-135-48 | 3 Structures<br>1 Rec | FC<br>Rec<br>Other | 23<br>199<br>26 | 248 | 122 | 2.0 | 126 | EA | Benefits 1350A flood plain |
| | Deer Creek Watershed | 96-135-51R-1 | 1 Structure<br>1 Rec | FC<br>Rec<br>Other | 361<br>172<br>21 | 554 | 113 | 4.9 | 441 | EA | Complements Cagles Mill Reservoir |
| | Little Walnut Creek Watershed | 96-135-51L-14 | 3 Structures<br>1 Rec | FC<br>Rec<br>Other | 65<br>67<br>12 | 144 | 98 | 1.5 | 46 | EA | Complements Big Walnut Reservoir |
| | Rattlesnake Creek Watershed | 96-157-0 | 1 Structure<br>1 Rec | FC<br>Rec<br>Other | 15<br>135<br>17 | 167 | 96 | 1.8 | 71 | EA | Provides localized flood control & Rec benefits |
| | Bryant Creek Watershed | 96-181-0 | 1 Structure<br>1 Rec | FC<br>Rec<br>Other | 7<br>51<br>7 | 65 | 29 | 2.2 | 36 | EA | Same |
| | Whitelick Creek Watershed | 96-200-0 | 7 Structures<br>1 WQ<br>1 Rec | FC<br>WQ<br>Rec<br>Other | 295<br>119<br>228<br>42 | 684 | 284 | 2.4 | 400 | EA | Complements recommended LR Martinsville Reservoir |
| | Killbuck Creek Watershed | 96-292-0 | Channel Improvement 29.1 miles | FC<br>D<br>Other | 44<br>17<br>9 | 70 | 53 | 1.3 | 17 | EA | Improves hydraulic efficiency of sluggish stream |
| | Wilson Creek Watershed | 96-32-0 | 1 Structure<br>1 WS<br>1 WQ<br>1 Rec | FC<br>WS<br>WQ<br>Rec<br>Other | 25<br>5<br>13<br>99<br>2 | 144 | 50 | 2.9 | 94 | EA | Improves WS, WQ in southern Knox Co. especially for Monroe City area |
| | Pipe Creek Watershed | 96-278-0 | 1 Structure | DATA NOT PRESENTLY AVAILABLE | | | | | LR | LR | Long Range projects partially meet needs expected during post 1985-2020 period |
| | Fish Creek Watershed | 96-142-0 | 6 Structures<br>1 Rec | FC<br>Rec<br>Other | 35<br>150<br>22 | 207 | 148 | 1.4 | 59 | LR | Same |
| | Hog-McIntyre Watershed | 96-135-37&40 | 2 Structures<br>2 Rec | FC<br>Rec<br>Other | 8<br>121<br>10 | 139 | 60 | 2.3 | 79 | LR | Same |
| | Six-Mile Creek Watershed | 96-135-35 | 5 Structures<br>1 Rec | FC<br>Rec<br>Other | 16<br>67<br>10 | 93 | 52 | 1.8 | 41 | LR | Same |

## TABLE C–42.WEST FORK WHITE SUBBASIN (CONTINUED)

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ($1,000) | ($1,000) | ($1,000) | | ($1,000) | | |
| | Doans Creek Watershed | 96-115-0 | 2 Structures | FC | 9 | 159 | 69 | 2.3 | 90 | LR | Long Range projects partially meet needs expected during post 1985-2020 period |
| | | | 1 Rec | Rec | 133 | | | | | | |
| | | | | Other | 17 | | | | | | |
| | Pond Creek Watershed | 96-135-9 | Channel Improvement 2.7 miles | FC | 5 | 5 | 3 | 1.8 | 2 | LR | Same |
| | Lick Creek Watershed | 96-135-3 | 6 Structures | FC | 30 | 149 | 93 | 1.6 | 56 | LR | Same |
| | | | 1 Rec | Rec | 103 | | | | | | |
| | | | | Other | 16 | | | | | | |
| | Burkhart Creek Watershed | 96-184-0 | 1 Structure | FC | 2 | 61 | 36 | 1.7 | 25 | LR | Same |
| | | | 1 Rec | Rec | 53 | | | | | | |
| | | | | Other | 6 | | | | | | |
| | Clear Creek Watershed | 96-200-0 | 1 Structure | FC | 3 | 148 | 53 | 2.8 | 95 | LR | Same |
| | | | 1 Rec | Rec | 130 | | | | | | |
| | | | | Other | 15 | | | | | | |
| | Plus 72 Non-feasible Watersheds | | | | | | | | | | |

1/ Early Action projects in the National Income Efficiency Plan were selected by the process of progressive summation. This technique is discussed in Section V, page 63, under Specific Methodology.

## TABLE C–43.UPPER WABASH SUBBASIN

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ($1,000) | ($1,000) | ($1,000) | | ($1,000) | | |
| | Deer Creek Reservoir | 329-4 | DA=280 | FC | 970 | 1,514 | 1,732 | 0.9 | — | LR | These LR projects expected to meet most future needs in Upper Wabash subbasin |
| | | | | Rec | 544 | | | | | | |
| | Denver (Eel River) Reservoir | 354-25 | DA=680 | FC | 1,380 | 2,905 | 2,830 | 1.0 | 75 | LR | Same |
| | | | | Rec | 1,525 | | | | | | |
| | Pipe Creek Reservoir | 363-6 | DA=167 | FC | 778 | 1,308 | 1,293 | 1.0 | 15 | LR | Same |
| | | | | Rec | 530 | | | | | | |
| | Tippecanoe Reservoir | 322-112 | DA=525 | FC | 669 | 1,539 | 2,667 | 0.6 | — | Rejected | Low B/C ratio, shallow pool |
| | | | | Rec | 870 | | | | | | |
| | Delphi Reservoir | 324 | DA=4,460 | FC | 4,660 | 6,933 | 7,149 | 1.0 | — | Rejected | Alternate to upper site, extensive relocations cost |
| | | | | Rec | 2,273 | | | | | | |
| | Delphi Reservoir (Upper Site) | 334 | DA=4,136 | FC | 2,510 | 4,452 | 4,691 | 1.0 | — | LR | Retained to meet future needs in main stem Wabash |
| | | | | Rec | 1,942 | | | | | | |
| | Petes Run | 317-46 | DA=339 | FC | 985 | 1,891 | 1,452 | 1.3 | 439 | Rejected | Small FC capability |
| | | | | Rec | 906 | | | | | | |
| | Levee Unit 22 (Urban) | 312-317 | 5.5 miles | FC | 28 | 28 | 30 | 1.0 | — | Rejected | Low B/C ratio |
| | Little River Watershed | 406-0 | 7 Structures | FC | 117 | 465 | 243 | 2.0 | 222 | EA | Provides needed benefits for rapidly urbanizing area |
| | | | 4 WQ | D | 33 | | | | | | |
| | | | 1 Rec | WQ | 161 | | | | | | |
| | | | | Rec | 108 | | | | | | |
| | | | | Other | 46 | | | | | | |
| | Buckeye-Hoosier Watershed | 480 | 4 Structures | FC | 268 | 851 | 615 | 1.4 | 236 | EA | Provides benefits for wide area in Ohio - Ind. (17,900 acres) |
| | | | 2 WQ | D | 2 | | | | | | |
| | | | 2 Rec | WQ | 43 | | | | | | |
| | | | | Rec | 440 | | | | | | |
| | | | | Other | 98 | | | | | | |
| | Salamonie River Watershed | 394-46 | 1 Structure | FC | 204 | 414 | 258 | 1.6 | 156 | EA | Provides direct benefits from land treatment for Salamonie Reservoir |
| | | | 1 Rec | D | 8 | | | | | | |
| | | | | Rec | 160 | | | | | | |
| | | | | Other | 42 | | | | | | |
| | Pony Creek Watershed | 358-56 | Channel | FC | 30 | 37 | 26 | 1.4 | 11 | EA | Drainage improvement |
| | | | Improvement | D | 4 | | | | | | |
| | | | 12.8 miles | Other | 3 | | | | | | |
| | Lower Mississinewa River Watershed | 375-0 | 2 Structures | FC | 9 | 114 | 83 | 1.4 | 31 | EA | Complements Mississinewa Reservoir |
| | | | 2 Rec | Rec | 93 | | | | | | |
| | | | | Other | 12 | | | | | | |
| | Upper Mississinewa River Watershed | 375-56 | Channel | FC | 101 | 130 | 130 | 1.0 | 0 | EA | Complements Mississinewa Reservoir |
| | | | Improvement | D | 17 | | | | | | |
| | | | 20.0 miles | Other | 12 | | | | | | |
| | Rock Creek Watershed (Cass County) | 341-0 | Channel | FC | 57 | 74 | 41 | 1.8 | 33 | EA | Drainage improvement for 2100A |
| | | | Improvement | D | 11 | | | | | | |
| | | | 18.4 miles | Other | 6 | | | | | | |
| | House-Bartee Watershed | 322-78 | Channel | FC | 44 | 67 | 49 | 1.4 | 18 | EA | Drainage improvement for 2150A |
| | | | Improvement | D | 15 | | | | | | |
| | | | 20.3 miles | Other | 8 | | | | | | |
| | Clear Creek Watershed | 405-0 | DATA NOT PRESENTLY AVAILABLE | | | | | | | EA | |
| | Sugar Creek Watershed | 322-0 | 1 Structure | FC | 20 | 226 | 130 | 1.7 | 96 | EA | Furnishes recreation, etc. for Delphi area |
| | | | 1 Rec | D | 18 | | | | | | |
| | | | | Rec | 163 | | | | | | |
| | | | | Other | 25 | | | | | | |

TABLE C-43. UPPER WABASH SUBBASIN (CONTINUED)

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ($1,000) | | ($1,000) | ($1,000) | | ($1,000) | | |
| | Burnetts Creek Watershed | 342-0 | Channel | FC | 13 | 28 | 16 | 1.8 | 12 | EA | EA projects below provide drainage |
| | | | Improvement | D | 9 | | | | | | improvement for approx 8,100 acres |
| | | | 9.8 miles | Other | 6 | | | | | | of agricultural lands |
| | Crooked Creek Watershed | 345-0 | Channel | FC | 25 | 34 | 23 | 1.5 | 11 | EA | See above |
| | | | Improvement | D | 5 | | | | | | |
| | | | 14.5 miles | Other | 4 | | | | | | |
| | Goose Creek Watershed | 355-0 | 3 Structures | DATA NOT PRESENTLY AVAILABLE | | | | | | EA | See above |
| | | | 3 Rec | | | | | | | | |
| | Brown-Hill Watershed | 322-34 | Channel | FC | 60 | 190 | 70 | 2.7 | 120 | EA | See above |
| | | | Improvement | D | 105 | | | | | | |
| | | | 31.5 miles | Other | 25 | | | | | | |
| | Big Monon Ditch Watershed | 322-36 | Channel | FC | 96 | 589 | 277 | 2.1 | 312 | EA | See above |
| | | | Improvement | D | 405 | | | | | | |
| | | | 55.6 miles | Other | 88 | | | | | | |
| | Mud Creek Watershed | 322-95 | Channel | FC | 53 | 142 | 126 | 1.1 | 116 | EA | See above |
| | | | Improvement | D | 64 | | | | | | |
| | | | 38.2 miles | Other | 25 | | | | | | |
| | Scuffle Creek Watershed | 394-43 | Channel | FC | 9 | 13 | 9 | 1.5 | 4 | LR | LR projects below provide drainage |
| | | | Improvement | D | 4 | | | | | | improvements for agricultural lands |
| | | | 7.2 miles | | | | | | | | |
| | Eel River Watershed | 354-58 | 1 Structure | DATA NOT PRESENTLY AVAILABLE | | | | | | LR | No structures except for the Eel River project |
| | Timmons Ditch Watershed | 322-38 | Channel | FC | 5 | 19 | 14 | 1.4 | 15 | LR | See above |
| | | | Improvement | D | 10 | | | | | | |
| | | | 9.9 miles | Other | 4 | | | | | | |
| | Ackerman Ditch Watershed | 322-45 | Channel | FC | 11 | 21 | 10 | 2.1 | 11 | LR | See above |
| | | | Improvement | D | 7 | | | | | | |
| | | | 6.3 miles | Other | 3 | | | | | | |
| | Quigley Marsh Ditch Watershed | 322-65 | Channel | FC | 44 | 74 | 8 | 8.9 | 62 | LR | See above |
| | | | Improvement | D | 21 | | | | | | |
| | | | 6.0 miles | Other | 9 | | | | | | |
| | Fell-Taylor Ditch Watershed | 322-77 | Channel | FC | 11 | 20 | 9 | 2.3 | 11 | LR | See above |
| | | | Improvement | D | 7 | | | | | | |
| | | | 3.5 miles | Other | 2 | | | | | | |
| | Chapman Creek Watershed | 322-86 | Channel | FC | 8 | 14 | 3 | 4.4 | 11 | LR | See above |
| | | | Improvement | D | 5 | | | | | | |
| | | | 3.0 miles | Other | 1 | | | | | | |
| | South Fork Wildcat Creek Watershed | 317-8-14 | Channel | DATA NOT PRESENTLY AVAILABLE | | | | | | LR | See above |
| | | | Improvement | | | | | | | | |
| | | | 16.8 miles | | | | | | | | |
| | Deer Creek Watershed | 329-0 | Channel | FC | 41 | 288 | 240 | 1.2 | 48 | LR | See above |
| | | | Improvement | D | 247 | | | | | | |
| | | | 95.5 miles | | | | | | | | |
| | Pleasant Run Watershed | 334-0 | Channel | FC | 2 | 6 | 6 | 0.9 | — | LR | See above |
| | | | Improvement | D | 3 | | | | | | |
| | | | 2.7 miles | Other | 1 | | | | | | |
| | Rattlesnake Creek Watershed | 338-0 | Channel | FC | 12 | 26 | 27 | 1.0 | — | LR | See above |
| | | | Improvement | D | 9 | | | | | | |
| | | | 13.7 miles | Other | 5 | | | | | | |
| | Plus 88 Non-feasible Projects | | | | | | | | | | |

1/ Early Action projects in the National Income Efficiency Plan were selected by the process of progressive summation. This technique is discussed in Section V, page 63, under Specific Methodology.

TABLE C- 44 MIDDLE WABASH RIVER SUBBASIN

| Project number | Project Name | Location mileage code | Description | Purpose & benefits | ($1,000) | Total benefits ($1,000) | Annual charges ($1,000) | B/C Ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Big Creek Reservoir | 196-3 | DA=99 | FC | 195 | 591 | 738 | 0.80 | – | Rejected | Low B/C Ratio for FC |
| | | | | Rec | 396 | | | | | | |
| | Brouilletts Reservoir | 226-5 | DA=321 | FC | 613 | 1,203 | 1,530 | 0.79 | – | Rejected | Low B/C Ratio for FC |
| | | | | Rec | 590 | | | | | | |
| | Coal Creek Reservoir | 225-4 | DA=256 | FC | 533 | 1,163 | 1,160 | 1.00 | 3 | LR | Partially meets LR demands for this area |
| | | | | Rec | 630 | | | | | | |
| | Crawfordsville Reservoir | 245-44 | DA=423 | FC | 831 | 2,326 | 1,760 | 1.32 | 566 | EA | Provides WS,WQ, & FC for Crawfordsville. Provides improved flows for recreational use. |
| | | | | Rec | 835 | | | | | | |
| | | | | WQ | 575 | | | | | | |
| | | | | WS | 85 | | | | | | |
| | Danville Reservoir | 257-28 | DA=970 | FC | 1,215 | 3,137 | 2,610 | 1.20 | 527 | Rejected | Alternate to Salt Fork |
| | | | | Rec | 862 | | | | | | |
| | | | | WQ | 1,060 | | | | | | |
| | Kickapoo Reservoir | 257-34 | DA=429 | FC | 664 | 2,484 | 2,227 | 1.12 | 257 | Rejected | State Res Site |
| | | | | Rec | 920 | | | | | | |
| | | | | WQ | 900 | | | | | | |
| | Little Vermilion Reservoir | 248-12 | DA=231 | FC | 513 | 1,071 | 1,171 | 0.91 | – | Rejected | Low B/C Ratio for FC |
| | | | | Rec | 558 | | | | | | |
| | Mill Creek Reservoir | 177-9 | DA=107 | FC | 180 | 427 | 689 | 0.62 | – | Rejected | Low B/C Ratio |
| | | | | Rec | 247 | | | | | | |
| | Montezuma Reservoir | 241 | DA=11,000 | FC | 5,054 | 7,524 | 21,500 | 0.35 | – | Rejected | Low B/C Ratio |
| | | | | Rec | 2,470 | | | | | | |
| | North Fork Vermilion Reservoir | 257-23-12 | DA=250 | FC | 616 | 1,217 | 1,171 | 1.04 | 46 | Rejected | Low B/C Ratio for FC |
| | | | | Rec | 601 | | | | | | |
| | Salt Fork Reservoir | 257-28-1 | DA=515 | FC | 685 | 2,591 | 2,208 | 1.17 | 383 | EA | *Partially meets needs* in Danville area |
| | | | | Rec | 920 | | | | | | |
| | | | | WQ | 986 | | | | | | |
| | Sugar Mill Reservoir | 245-11-2 | DA=59 | FC | 39 | 621 | 781 | 0.80 | – | Rejected | Low FC Benefits |
| | | | | Rec | 582 | | | | | | |
| | Sugar Creek Reservoir (Ill.) | 210-11 | DA=67 | FC | 213 | 739 | 719 | 1.03 | – | Rejected | Small drainage area |
| | | | | Rec | 224 | | | | | | |
| | | | | WS | 302 | | | | | | |
| | Young and Neal Levee (Agricultural) | 285 to 287L | 3.2 miles | FC | 23 | 23 | 30 | 0.77 | – | Rejected | Low B/C Ratio |
| | Wabash & Fulton Levee (Agricultural) | 260 to 265L | 4.7 Miles | FC | 38 | 38 | 48 | 0.80 | – | Rejected | Low B/C Ratio |
| | Raccoon Creek Watershed (Ill.) | 111-0 | Channel Improvement 18.9 miles | FC | 144 | 178 | 93 | 1.9 | 85 | EA | Benefits 3,700 acres through improved drainage |
| | | | | D | 16 | | | | | | |
| | | | | Other | 18 | | | | | | |
| | Snapp Kelso Creek Watershed | 129-0 | 1 structure 1 Rec. | FC | 5 | 83 | 59 | 1.4 | 24 | EA | Provides Rec, FC in Vincennes area |
| | | | | Rec | 75 | | | | | | |
| | | | | Other | 3 | | | | | | |
| | Martah Creek Watershed | 135-0 | 2 structures | FC | 94 | 119 | 74 | 1.6 | 45 | EA | Benefits 5,000 Ac |
| | | | | D | 2 | | | | | | |
| | | | | Rec | 15 | | | | | | |
| | | | | Other | 8 | | | | | | |
| | Turtle Creek Watershed | 162-0 | 8 structures 2 WS 5 Rec | FC | 37 | 111 | 68 | 1.6 | 43 | EA | Provides FC,Rec to Western Sullivan Co |
| | | | | Rec | 45 | | | | | | |
| | | | | WS | 11 | | | | | | |
| | | | | Other | 18 | | | | | | |
| | Mill Creek Watershed (Ill.) | 177-0 | 8 structures 1 Rec | FC | 84 | 321 | 211 | 1.5 | 110 | EA | Flood control benefits to 4,550 Ac + Rec |
| | | | | Rec | 210 | | | | | | |
| | | | | Other | 27 | | | | | | |

TABLE C-41 MIDDLE WABASH RIVER SUBBASIN (CONTINUED)

| Project number | Project name | Location milcage code | Description | Purpose and benefits | ($1,000) | Total benefits ($1,000) | Annual charges ($1,000) | B/C ratio to 1.0 | Net benefits ($1,000) | Selected plan1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Honey Creek Watershed | 204-0 | 8 structures | FC | 291 | 380 | 245 | 1.6 | 135 | EA | EA projects below incl: Honey Cr provide FC benefits for 36,980 Ac of high yielding agric lands in addition to rec and drainage |
| | | | 1 Rec | Rec | 67 | | | | | | |
| | | | | Other | 22 | | | | | | |
| | Otter Creek Watershed | 223-0 | 5 structures | FC | 68 | 413 | 243 | 1.6 | 170 | EA | |
| | | | 1 Rec | Rec | 338 | | | | | | |
| | | | | Other | 7 | | | | | | |
| | Coal Creek Watershed | 255-0 | 2 structures | FC | 191 | 345 | 117 | 2.9 | 228 | EA | |
| | | | 1 Rec | Rec | 134 | | | | | | |
| | | | | Other | 20 | | | | | | |
| | Big Raccoon Creek Watershed | 238-0 | 8 structures | FC | 99 | 155 | 86 | 1.8 | 69 | EA | |
| | | | 7 Rec | Rec | 44 | | | | | | |
| | | | | Other | 12 | | | | | | |
| | Jordan Creek Watershed | 257-23-23-0 | Channel | FC | 38 | 55 | 35 | 1.5 | 20 | EA | |
| | | | Improvement | D | 15 | | | | | | |
| | | | 24.6 miles | Other | 2 | | | | | | |
| | Lye Creek Watershed | 245-48-0 | Channel | FC | 107 | 139 | 73 | 1.9 | 66 | EA | |
| | | | Improvement | D | 19 | | | | | | |
| | | | 42.9 miles | Other | 13 | | | | | | |
| | Fall Creek Watershed | 286-0 | 1 structure | FC | 1 | 31 | 23 | 1.3 | 8 | EA | |
| | | | 1 Rec | Rec | 30 | | | | | | |
| | Vieke Ditch Watershed | 114-0 | Channel | FC | 90 | 108 | 24 | 4.4 | 84 | EA | |
| | | | Improvement | D | 8 | | | | | | |
| | | | 13.2 miles | Other | 10 | | | | | | |
| | City Ditch Watershed | 118-0 | Channel | FC | 69 | 80 | 21 | 3.9 | 59 | EA | |
| | | | Improvement | D | 5 | | | | | | |
| | | | 10.8 miles | Other | 6 | | | | | | |
| | Sugar Creek Watershed (Ill.) | 210-0 | 2 structures | FC | 60 | 162 | 88 | 1.8 | 74 | EA | |
| | | | 1 WS | WS | 62 | | | | | | |
| | | | 1 WQ | WQ | 25 | | | | | | |
| | | | | Other | 15 | | | | | | |
| | Lower Shaker Prairie Watershed | 138-0 | Channel | FC | 39 | 44 | 19 | 2.2 | 25 | EA | |
| | | | Improvement | D | 1 | | | | | | |
| | | | 10.1 miles | Other | 4 | | | | | | |
| | Snyder Creek Watershed | 184-0 | 1 structure | FC | 31 | 33 | 19 | 1.8 | 14 | EA | |
| | | | | Other | 2 | | | | | | |
| | Feather Creek Watershed | 232-0 | 1 structure | FC | 28 | 142 | 81 | 1.8 | 61 | EA | |
| | | | 1 Rec. | Rec | 100 | | | | | | |
| | | | | Other | 14 | | | | | | |
| | Crawfish Creek Watershed | 100-0 | Channel | FC | Data Not Presently Available | | | | | LR | |
| | | | Improvement | D | | | | | | | |
| | | | 15.3 miles | | | | | | | | |
| | Turman Creek Watershed | | 2 structures | FC | 35 | 38 | 38 | 1.0 | — | LR | LR watershed projects below and next page encompass total project areas of 708 sq miles with structural control of 201 sq miles. Projects also furnish substantial recreation. |
| | | | | Other | 3 | | | | | | |
| | Raccoon Creek Watershed (Illinois) | 174-0 | 2 Structures | FC | 23 | 140 | 78 | 1.8 | 62 | LR | |
| | | | 1 Rec | Rec | 103 | | | | | | |
| | | | | Other | 14 | | | | | | |
| | Lost Creek Watershed | 219-0 | 1 Structure | FC | 16 | 17 | 27 | 0.7 | — | LR | |
| | | | | Other | 1 | | | | | | |
| | Big Creek Watershed (Illinois) | 196-0 | 4 Structures | FC | 48 | 316 | 158 | 2.0 | 158 | LR | |
| | | | 2 Rec | Rec | 235 | | | | | | |
| | | | | Other | 33 | | | | | | |
| | Clear Creek Watershed (Illinois) | 206-0 | 2 Structures | FC | 25 | 185 | 132 | 1.4 | 53 | LR | |
| | | | 1 Rec | Rec | 142 | | | | | | |
| | | | | Other | 18 | | | | | | |

TABLE C 44. MIDDLE WABASH RIVER SUBBASIN (CONTINUED)

| Project number | Project name | Location mileage code | Description | Purpose and benefits | ($1,000) | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ($1,000) | ($1,000) | ($1,000) | | ($1,000) | | |
| | Norton Creek Watershed | 232-0 | 2 Structures | FC | 9 | 157 | 75 | 2.1 | 82 | LR | See preceding page |
| | | | 1 Rec | Rec | 131 | | | | | | |
| | | | | Other | 17 | | | | | | |
| | Big Shawnee Creek Watershed | 284-0 | Channel | FC | 6 | 35 | 44 | 0.8 | -- | LR | |
| | | | Improvement | D | 21 | | | | | | |
| | | | 24.1 miles | Other | 8 | | | | | | |
| | Cole Branch Watershed | 257-9-0 | 1 Structure | FC | 2 | 3 | 10 | 0.3 | -- | LR | |
| | | | | Other | 1 | | | | | | |
| | Stony Creek Watershed (Illinois) | 257-28-10 | Channel | FC | 9 | 32 | 34 | 0.9 | -- | LR | |
| | | | Improvement | D | 18 | | | | | | |
| | | | 16.5 miles | Other | 5 | | | | | | |
| | Sugar Mill Watershed | 245-11-2 | 3 Structures | FC | 24 | 123 | 68 | 1.8 | 55 | LR | |
| | | | 1 Rec | Rec | 99 | | | | | | |
| | Little Sugar Creek Watershed | 245-41-3 | Channel | FC | 6 | 10 | 11 | 0.9 | -- | LR | |
| | | | Improvement | D | 2 | | | | | | |
| | | | 8.3 miles | Other | 2 | | | | | | |
| | Plus 74 Non-feasible Watersheds | | | | | | | | | | |

1/ Early Action projects in the National Income Efficiency Plan were selected by the process of progressive summation. This technique is discussed in Section V, page 63, under Specific Methodology.

## TABLE C–45. EMBARRAS RIVER SUBBASIN

| Project number | Project name | Location mileage code | Description | Purpose and benefits ($1,000) | | Total benefits ($1,000) | Annual charges ($1,000) | B/C ratio to 1.0 | Net benefits ($1,000) | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | North Fork Embarras River Reservoir | 122-44-26 | DA=147 | FC | 216 | 506 | 1,082 | 0.5 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 290 | | | | | | |
| | Woodbury Reservoir | 122-81-7 | DA=134 | FC | 218 | 418 | 878 | 0.5 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 200 | | | | | | |
| | Crooked Creek Reservoir | 122-53-4 | DA=73 | FC | 81 | 279 | 653 | 0.4 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 198 | | | | | | |
| | Westport Levee (Agricultural) | 122-13 to 29L | 16.5 miles | FC | 127 | 127 | 230 | 0.6 | — | Rejected | Low B/C Ratio |
| | Lawrenceville Levee (Agricultural) | 122-9 to 13L | 3.3 miles | FC | 7 | 7 | 55 | 0.1 | — | Rejected | Low B/C Ratio |
| | Brushy Creek Watershed | 122-152-0 | Channel | FC | 35 | 60 | 56 | 1.1 | 4 | EA | Following EA watershed projects provide FC benefits for 35,310 A with total benefits (all purposes) of $2.4 million annually. |
| | | | Improvement | D | 19 | | | | | | |
| | | | 17.0 miles | Other | 6 | | | | | | |
| | Muddy Creek Watershed | 122-81-0 | 6 Structures | FC | 181 | 450 | 304 | 1.5 | 146 | EA | |
| | | | 1 WS | WS | 19 | | | | | | |
| | | | 1 WQ | WQ | 15 | | | | | | |
| | | | 1 Rec | Rec | 205 | | | | | | |
| | | | | Other | 30 | | | | | | |
| | North Fork Embarras Watershed | 122-44-0 | 12 Structures | FC | 702 | 1,261 | 646 | 2.0 | 615 | EA | |
| | | | 2 WS | WS | 33 | | | | | | |
| | | | 2 WQ | WQ | 74 | | | | | | |
| | | | 3 Rec | Rec | 380 | | | | | | |
| | | | | Other | 72 | | | | | | |
| | Crooked Creek Watershed | 122-53-0 | 5 Structures | FC | 90 | 175 | 104 | 1.6 | 71 | EA | |
| | | | 1 Rec | Rec | 67 | | | | | | |
| | | | | Other | 18 | | | | | | |
| | Muddy Creek Watershed (17g-5) | 122-13-0 | 2 Structures | FC | 116 | 174 | 104 | 1.7 | 70 | EA | |
| | | | 1 WQ | D | 25 | | | | | | |
| | | | | WQ | 14 | | | | | | |
| | | | | Other | 19 | | | | | | |
| | Brushy-Birch Creek Watershed | 122-9-0 | 5 Structures | FC | 118 | 265 | 121 | 2.2 | 144 | EA | |
| | | | 1 WQ | WQ | 8 | | | | | | |
| | | | 1 Rec | Rec | 116 | | | | | | |
| | | | | Other | 23 | | | | | | |
| | Otter-Beaver-Allison Watershed | 122-0 | Channel | FC | 75 | 142 | 89 | 1.6 | 53 | LR | These LR projects furnish benefits for 236 square miles of project area (total) |
| | | | Improvement | D | 40 | | | | | | |
| | | | 38.2 miles | Other | 27 | | | | | | |
| | Honey Creek Watershed | 122-24-0 | 2 Structures | FC | 42 | 139 | 73 | 1.9 | 66 | LR | |
| | | | 1 Rec | Rec | 83 | | | | | | |
| | | | | Other | 14 | | | | | | |
| | Range Creek Watershed | 122-78-0 | 3 Structures | FC | 59 | 180 | 138 | 1.3 | 42 | LR | |
| | | | 1 Rec | Rec | 103 | | | | | | |
| | | | | Other | 18 | | | | | | |
| | Hurricane Creek Watershed | 122-94-0 | 2 Structures | FC | 45 | 50 | 52 | 1.0 | — | LR | |
| | | | | Other | 5 | | | | | | |
| | Plus 23 Non-feasible Watersheds | | | | | | | | | | |

1/ Early Action projects in the National Income Efficiency Plan were selected by the process of progressive summation. This technique is discussed in Section V, page 63, under Specific Methodology.

## TABLE C-46. LITTLE WABASH RIVER SUBBASIN

| Project number | Project name | Location mileage code | Description | Purpose and benefits ($1,000) | | Total benefits ($1,000) | Annual charges ($1,000) | B/C ratio to 1.0 | Net benefits ($1,000) | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elm River Reservoir | 15-84-15 | DA=155 | FC | 90 | 455 | 1,515 | 0.3 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 365 | | | | | | |
| | Wilcox Bridge Reservoir | 15-129 | DA=1,130 | FC | 967 | 1,914 | 5,260 | 0.4 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 947 | | | | | | |
| | Big Muddy Creek Reservoir | 15-129-12 | DA=105 | FC | 203 | 411 | 817 | 0.5 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 208 | | | | | | |
| | Effingham Reservoir | 15-207 | DA=218 | FC | 379 | 835 | 1,049 | 0.8 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 456 | | | | | | |
| | Fox River Reservoir | 15-107-20 | DA=84 | FC | 140 | 327 | 836 | 0.4 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 187 | | | | | | |
| | Horse Creek Reservoir | 15-40-45-3 | DA=98 | FC | 90 | 338 | 811 | 0.4 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 248 | | | | | | |
| | Brush Creek Reservoir | 15-40-2 | DA=42 | FC | 110 | 290 | 297 | 1.0 | — | Rejected | Low B/C Ratio |
| | | | | Rec | 180 | | | | | | |
| | Skillet Fork Levee Unit 1A (Agricultural) | 15-40-6 to 9L | 4.4 miles | FC | 16 | 16 | 67 | 0.2 | — | Rejected | Low B/C Ratio |
| | Skillet Fork Levee Unit 1B (Agricultural) | 15-40-16 to 19L | 4.8 miles | FC | 19 | 19 | 71 | 0.3 | — | Rejected | Low B/C Ratio |
| | Skillet Fork Levee Unit 3 (Agricultural) | 15-40-19 to 29L | 8.4 miles | FC | 44 | 44 | 160 | 0.3 | — | Rejected | Low B/C Ratio |
| | Skillet Fork Levee Unit 3A (Agricultural) | 15-40-19 to 36L | 11.4 miles | FC | 82 | 82 | 232 | 0.4 | — | Rejected | Low B/C Ratio |
| | Eagle Slough – Main and Southern Outlet Levee System (Agricultural) | 15-40-17 to 21R | 31.3 miles | FC | 291 | 291 | 453 | 0.6 | — | Rejected | Low B/C Ratio |
| | Little Wabash Levee Unit 3 (Agricultural) | 15-84-91R | 9.0 miles | FC | 90 | 90 | 127 | 0.7 | — | LR | Regional development |
| | Little Wabash Levee Unit 7 (Agricultural) | 15-114-121R | 4.8 miles | FC | 52 | 52 | 41 | 1.3 | 11 | EA | Regional development |
| | Little Wabash Levee Unit 8 (Agricultural) | 15-110-118L | 3.6 miles | FC | 39 | 39 | 45 | 0.9 | — | EA | Regional development |
| | Little Wabash Levee Unit 9 (Agricultural) | 15-129-136L | 6.6 miles | FC | 20 | 70 | 33 | 2.1 | 37 | LR | Regional development |
| | Lick Creek Watershed | 15-22 | 2 Structures | FC | 40 | 189 | 85 | 2.2 | 104 | EA | EA projects this group provide for FC benefits for $1,900 A flood plain agric. lands in addition to other benefits amounting to $2 million annually. |
| | | | 1 Rec | Rec | 131 | | | | | | |
| | | | | Other | 18 | | | | | | |
| | Auxier-Big Creek Watershed | 15-40-18 | 4 Structures | FC | 161 | 348 | 238 | 1.5 | 110 | EA | |
| | | | 1 WS | D | 58 | | | | | | |
| | | | 1 Rec | WS | 46 | | | | | | |
| | | | | Rec | 22 | | | | | | |
| | | | | Other | 61 | | | | | | |
| | Big Mound Watershed | 15-40-19 | 1 Structure | FC | 75 | 88 | 56 | 1.6 | 32 | EA | |
| | | | | D | 6 | | | | | | |
| | | | | Other | 7 | | | | | | |
| | Pond Creek Watershed | 15-74 | 1 Structure | FC | 33 | 131 | 107 | 1.2 | 24 | EA | |
| | | | 1 Rec | D | 11 | | | | | | |
| | | | | Rec | 72 | | | | | | |
| | | | | Other | 15 | | | | | | |

TABLE C–46. LITTLE WABASH RIVER SUBBASIN (CONTINUED)

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ($1,000) | ($1,000) | ($1,000) | | ($1,000) | | |
| | Big Muddy Creek Watershed | 15-129 | 7 Structures | FC | 191 | 551 | 305 | 1.8 | 246 | EA | See preceding page |
| | | | 2 Rec | Rec | 304 | | | | | | |
| | | | | Other | 56 | | | | | | |
| | Dry Fork Watershed | 15-40-30 | 4 Structures | FC | 131 | 511 | 161 | 3.2 | 350 | EA | |
| | | | 1 WS | WS | 15 | | | | | | |
| | | | 1 Rec | Rec | 154 | | | | | | |
| | | | | Other | 211 | | | | | | |
| | Horse Creek Watershed | 15-40-36 | 5 Structures | FC | 128 | 364 | 206 | 1.8 | 158 | EA | |
| | | | 1 WS | WS | 25 | | | | | | |
| | | | 1 Rec | Rec | 178 | | | | | | |
| | | | | Other | 33 | | | | | | |
| | Upper Little Wabash River Watershed | 15-208 | 7 Structures | FC | 176 | 255 | 175 | 1.5 | 80 | EA | |
| | | | 1 WS | WS | 4 | | | | | | |
| | | | 3 WQ | WQ | 61 | | | | | | |
| | | | | Other | 20 | | | | | | |
| | Fox River Watershed | 15-107 | 5 Structures | FC | 171 | 410 | 304 | 1.3 | 106 | EA | |
| | | | 1 WS | WS | 10 | | | | | | |
| | | | 1 WQ | WQ | 58 | | | | | | |
| | | | 1 Rec | Rec | 132 | | | | | | |
| | | | | Other | 39 | | | | | | |
| | Salt Creek Watershed | 15-186 | 4 Structures | FC | 51 | 160 | 121 | 1.3 | 39 | EA | |
| | | | 1 Rec | Rec | 93 | | | | | | |
| | | | | Other | 16 | | | | | | |
| | Limekiln Creek Watershed | 15-40-8 | Channel Improvement 4.8 miles | FC | 22 | 27 | 7 | 3.7 | 20 | LR | LR watersheds for this subbasin would involve 665 square miles of total project areas with 24 structures controlling 312 square miles of drainage area |
| | | | | D | 3 | | | | | | |
| | | | | Other | 2 | | | | | | |
| | Lost Creek Watershed | 15-40-13 | 2 Structures | FC | 66 | 75 | 31 | 2.4 | 44 | LR | |
| | | | | Other | 9 | | | | | | |
| | Beaver Creek Watershed | 15-40-14 | Channel Improvement 7.9 miles | FC | 39 | 42 | 14 | 2.9 | 28 | LR | |
| | | | | Other | 3 | | | | | | |
| | Prairie Creek Watershed | 15-40-16 | Channel Improvement 4.9 miles | FC | 28 | 33 | 8 | 3.9 | 25 | LR | |
| | | | | D | 2 | | | | | | |
| | | | | Other | 3 | | | | | | |
| | Nameless Creek Watershed | 15-40-18 | 1 Structure | FC | 7 | 29 | 18 | 1.6 | 11 | LR | |
| | | | 1 WS | WS | 20 | | | | | | |
| | | | | Other | 2 | | | | | | |
| | Brush Creek Watershed | 15-40-57 | 2 Structures | FC | 69 | 74 | 67 | 1.1 | 7 | LR | |
| | | | | Other | 5 | | | | | | |
| | Elliot Creek Watershed | 15-47 | Channel Improvement 2.3 miles | FC | 26 | 27 | 8 | 3.4 | 19 | LR | |
| | | | | Other | 1 | | | | | | |
| | Big Creek Watershed | 15-50 | Channel Improvement 18.8 miles | DATA NOT PRESENTLY AVAILABLE | | | | | LR | | |
| | Elm River Watershed | 15-84 | 13 Structures | FC | 262 | 576 | 480 | 1.2 | 96 | LR | |
| | | | 2 Rec | Rec | 262 | | | | | | |

## TABLE C–46. LITTLE WABASH SUBBASIN (CONTINUED)

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ($1,000) | ($1,000) | ($1,000) | | ($1,000) | | |
| | Crooked Creek Watershed | 15-162 | 1 Structure | FC | 16 | 18 | 20 | 0.9 | – | LR | See preceding page |
| | | | | Other | 2 | | | | | | |
| | Dismal Creek Watershed | 15-165 | 1 Structure | FC | 25 | 28 | 30 | 1.0 | – | LR | |
| | | | | Other | 3 | | | | | | |
| | Bishop Creek Watershed | 15-183 | 2 Structures | FC | 25 | 47 | 39 | 1.2 | 8 | LR | |
| | | | 1 WS | WS | 19 | | | | | | |
| | | | | Other | 3 | | | | | | |
| | Plus 27 Non-feasible Watersheds | | | | | | | | | | |

1/ Early Action projects in the National Income Efficiency Plan were selected by the process of progressive summation. This technique is discussed in Section V, page 63, under Specific Methodology.

## TABLE C–47. LOWER WABASH RIVER SUBBASIN

| Project number | Project name | Location mileage code | Description | Purpose and benefits | | Total benefits | Annual charges | B/C ratio to 1.0 | Net benefits | Selected plan 1/ | Reason for selection or rejection 1/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ($1,000) | ($1,000) | ($1,000) | | ($1,000) | | |
| | Bonpas Reservoir | 65-24 | DA=174 | FC | 261 | 811 | 1,135 | 0.7 | – | Rejected | Low B/C Ratio |
| | | | | Rec | 550 | | | | | | |
| | Wabash River Levee Unit 50 (Agricultural) | 51-54L | 7.2 miles | FC | 38 | 38 | 34 | 1.1 | 4 | EA | Protects 3,060 acres |
| | Big Creek Watershed | 28-0 | 10 Structures | FC | 524 | 674 | 290 | 2.3 | 384 | EA | EA watershed projects provide FC benefits for 30,200 A of highly productive cropland in addition to substantial recreation benefits |
| | | | 1 Rec | D | 11 | | | | | | |
| | | | | Rec | 139 | | | | | | |
| | Gresham Creek Watershed | 52-0 | 13 Structures | FC | 64 | 323 | 161 | 2.0 | 162 | EA | |
| | | | 1 Rec | D | 7 | | | | | | |
| | | | | Rec | 222 | | | | | | |
| | | | | Other | 30 | | | | | | |
| | McHenry-Hawthorne Watershed | 49-0 | | DATA NOT PRESENTLY AVAILABLE | | | | EA | | | |
| | Scott Ditch-Coffee Bayou Watershed | 89-0 | 3 Structures | FC | 99 | 540 | 213 | 2.5 | 327 | EA | |
| | | | 1 Rec | D | 52 | | | | | | |
| | | | | Rec | 321 | | | | | | |
| | | | | Other | 68 | | | | | | |
| | Bonpas Creek Watershed | 65-0 | 9 Structures | FC | 263 | 642 | 471 | 1.4 | 171 | EA | |
| | | | 1 WS | D | 79 | | | | | | |
| | | | 1 WQ | WS | 13 | | | | | | |
| | | | 1 Rec | WQ | 15 | | | | | | |
| | | | | Rec | 194 | | | | | | |
| | | | | Other | 78 | | | | | | |
| | Black River Watershed | 55-0 | 4 Structures | FC | 291 | 419 | 123 | 3.4 | 296 | LR | LR projects this subbasin would include 121 square miles of total project area with 13 square miles of drainage area controlled by 6 structures |
| | | | 1 Rec | Rec | 99 | | | | | | |
| | | | | Other | 29 | | | | | | |
| | French Creek Watershed | 62-0 | 2 Structures | FC | 37 | 193 | 92 | 2.1 | 101 | LR | |
| | | | 1 Rec | Rec | 137 | | | | | | |
| | | | | Other | 19 | | | | | | |
| | Plus 4 Non-feasible Watersheds | | | | | | | | | | |

1/ Early Action projects in the National Income Efficiency Plan were selected by the process of progressive summation. This technique is discussed in Section V, page 63, under Specific Methodology.

## 27. FLOOD PLAIN MANAGEMENT ELEMENT

The basin cities are expanding; new buidlings are being built; industries are constructing new plants; and most of this is taking place on previously undeveloped lands. This growth is most necessary and healthy so long as it respects the land on which it is built. Physical protection against floods, such as dams and floodwalls, cannot answer the complete problem as the rate of development in the flood plain exceeds any possible plan for complete physical protection. One-hundred and fifteen areas where some development has taken place in flood hazard areas or where there is an identified potential for development within the flood plain are listed in table C–48. These communities would benefit from intensive flood plain management practices including zoning, building codes, flood proofing, ample warning, or evacuation. Of the 115 areas, 53 were selected as having high priority need in the early action program and 59 areas are of lesser priority. Flood plain management reports have been completed for three communities.

## 28. LAND TREATMENT ELEMENT

Over 8,461,000 acres of land are included in the projects recommended for early action. Land treatment needed on these lands are included in the plan; treatment needs include measures that have a significant effect on reducing runoff, erosion, and sediment production. Essentially the early action recommendations consist of three principal elements. The first of these is the accelerated land treatment for watershed protection under Public Law 566; a second feature is the acceleration of land treatment in the drainage areas above major reservoirs in the basin. Third, would be the accomplishments expected under the going PL–46 program, the cooperative State-Federal forestry program and other going programs in all areas of the basin. Overall the 8.5 million acre program includes 6.5 million acres of cropland, 901 thousand acres of pasture, 680 thousand acres of forest land, 208 thousand acres of other land and 216 thousand acres of urban land. In addition to the early action program, land treatments that cannot be reasonably completed during the early action period are scheduled for completion in the long range program. The remaining program, not including maintenance on the existing and early action program measures, would include treatment of 5.1 million acres. Table C–49 summarizes the land treatment features.

The U.S. Forest Service in addition to forestry land treatment aspects, is interested in the development of recreational areas and in the enhancement of the environment as shown in the following tabulation.

| Recreational Developments | Unit | Quantity |
|---|---|---|
| Land | Acres | 152 |
| Water | Acres | 510 |
| Roads and Trails | Miles | 142 |
| Scenic Drives (1) | Miles | 23 |
| Identification of Public Lands | Miles | 600 |

TABLE C–48. COMMUNITIES IDENTIFIED FOR POTENTIAL FLOOD PLAIN MANAGEMENT SERVICES BY SUBBASIN

Patoka Subbasin

Dubois
Huntingburg [1/]
Jasper [1/]
Patoka [1/]
Winslow [1/]

East Fork Subbasin

Austin [1/]
Bedford
Bethel Village
Bloomington
Columbus [3/]
Edinburg [1/]
Franklin [1/]
French Lick [1/]
Greenfield
Greensburg
Greenwood (Johnson County)
Knightstown [1/]
New Castle [1/]
New Whiteland
North Vernon [1/]
Orleans [1/]
Paoli [1/]
Rushville
Scottsburg [1/]
Seymour [1/]
Shelbyville [1/]
Shoals
West Baden [1/]

West Fork Subbasin

Alexandria
Anderson [2/]
Anderson, East Side [1/]
Bicknell
Brooklyn
Brownsburg
Chesterfield [1/]
Danville
Elwood
Greenwood
Linton

West Fork Subbasin (Cont'd)

Indianapolis [2/]
Beech Grove [2/]
Lawrence [2/]
Speedway [2/]
Martinsville [1/]
Mooresville [1/]
Muncie [2/]
Noblesville
Petersburg
Plainfield
Spencer [1/]
Tipton
Washington
Winchester

Upper Wabash Subbasin

Bluffton
Delphi [1/]
Edna Mills
Fairmount
Gas City [1/]
Hartford City [1/]
Home Corner
Huntington
Kokomo [2/]
Lafayette [3/]
Logansport [1/]
Marion [1/]
Monitor
North Manchester
Peru [1/]
Portland
Union City
Wabash [1/]
Warsaw
West Lafayette [3/]

Middle Wabash Subbasin

Attica [1/]
Clinton [1/]
Covington
Crawfordsville [1/]
Danville, Illinois [1/]

Middle Wabash Subbasin (Cont'd)

Eugene
Hutsonville, Illinois
Lebanon
Montezuma
Newport
Paris, Illinois
Paxton, Illinois
Rantoul, Illinois
St. Joseph, Illinois
Terre Haute [1/]
Urbana, Illinois [1/]
Vincennes [1/]
West Terre Haute [1/]
York, Illinois

Embarras Subbasin

Birds
Camargo
Charleston, Illinois [2/]
Lawrenceville, Illinois [1/]
Mattoon, Illinois
Newman
Newton, Illinois
Tuscola, Illinois
Villa Grove [1/]

Little Wabash Subbasin

Carmi, Illinois [1/]
Clay City [1/]
Concord (Emma)
Crossville [1/]
Effingham [1/]
Fairfield
Golden Gate
Louisville
Mill Shoals
New Haven
Springerton

Lower Wabash Subbasin

Grayville, Illinois
Mt. Carmel, Illinois [1/]
New Harmony [1/]

1/ High priority - early action.
2/ Authorized flood plain management study.
3/ Completed flood plain management study.

TABLE C–49. LAND TREATMENT

| Economic subarea | Cropland | Pasture | Forest | Urban | Other | Total |
|---|---|---|---|---|---|---|
| | | | (1,000 acres) | | | |
| | | | Early Action | | | |
| 1 | 895 | 240 | 277 | 56 | 54 | 1,522 |
| 2 | 1,350 | 201 | 160 | 84 | 60 | 1,855 |
| 3 | 594 | 96 | 61 | 6 | 14 | 771 |
| 4 | 1,105 | 106 | 54 | 15 | 23 | 1,303 |
| 5 | 572 | 76 | 60 | 6 | 12 | 726 |
| 6 | 1,940 | 182 | 68 | 49 | 45 | 2,284 |
| TOTAL | 6,456 | 901 | 680 | 216 | 208 | 8,461 |
| | | | Long Range | | | |
| 1 | 420 | 120 | 490 | 186 | 26 | 1,242 |
| 2 | 500 | 41 | 259 | 316 | 24 | 1,140 |
| 3 | 216 | 34 | 92 | 36 | 5 | 383 |
| 4 | 405 | 40 | 93 | 78 | 10 | 626 |
| 5 | 298 | 46 | 115 | 30 | 7 | 496 |
| 6 | 840 | 68 | 93 | 177 | 23 | 1,201 |
| TOTAL | 2,679 | 349 | 1,142 | 823 | 95 | 5,088 |

## SECTION VI – MODIFICATION OF NATIONAL INCOME EFFICIENCY PLAN IN THE INTEREST OF REGIONAL DEVELOPMENT

### 29. GENERAL

We have now developed a plan which meets a great portion of the projected needs of the basin and contributes to National Income Efficiency. We now need to determine what modifications to the plan are required in the interest of biased promotion of the basin's resource base for regional development. In its simplest terms, this means biased consideration for the Wabash basin as contrasted with other competing basins. Regional Development means transfer of opportunities from other regions to the Wabash. The Wabash is in a generally favorable position so far as per capita income is concerned as evidenced by table C–50. Those counties having a per capita income less than the national average are listed in table C–51. It is these latter counties which could be benefited by Regional Development.

### 30. REGIONAL OBJECTIVES

In order to objectively impute regionality into the planning process we need to articulate the regional objectives. This we have attempted to do for the Wabash basin. These objectives may be simply stated as:

a. Provide an economic posture not in too great an imbalance with the economic posture of the Nation and competing regions.

b. Provide opportunities for diversity of economic opportunities.

c. Provide opportunities for orderly assimilation of projected population growth.

It should be remembered that regional development is dependent upon a variety of programs, means and availability of opportunities.

TABLE C–50. PER CAPITA PERSONAL INCOME
UNITED STATES AND WABASH RIVER BASIN
1950–1968[1/] AND 1980–2020[2/]
(1967 dollars)

| Area | Year | | | | | |
|---|---|---|---|---|---|---|
| | 1950 | 1959 | 1968 | 1980 | 2000 | 2020 |
| United States | 2,065 | 2,441 | 3,301 | 4,764 | 8,288 | 14,259 |
| White and Patoka | 2,145 | 2,471 | 3,335 | 4,910 | 8,506 | 14,586 |
| Wabash | 1,747 | 2,095 | 2,976 | 4,483 | 7,889 | 13,645 |
| Wabash River Basin | 1,949 | 2,279 | 3,173 | 4,722 | 8,240 | 14,186 |

1/ SOURCE: U.S. Bureau of the Census, 1950, 1960 and 1970 reports.
2/ Preliminary projections prepared by the Office of Business Economics, U.S. Department of Commerce and the Economics Research Service, U.S. Department of Agriculture

TABLE C–51. LOW INCOME COUNTIES[1/]
(Based on 1960 Dollars)

| Economic subarea | County | Average income | Economic subarea | County | Average income |
|---|---|---|---|---|---|
| 1 | Brown | $1,428 | 4 | Clark | $1,394 |
| | Daviess | 1,391 | | Coles | 1,702 |
| | Dubois | 1,382 | | Crawford | 1,731 |
| | Jennings | 1,272 | | Cumberland | 1,313 |
| | Martin | 1,226 | | Douglas | 1,615 |
| | Orange | 1,243 | | Edgar | 1,460 |
| | Pike | 1,406 | | Jasper | 1,239 |
| | Posey | 1,406 | | Lawrence | 1,568 |
| | Scott | 1,370 | | Vermilion | 1,746 |
| | Washington | 1,292 | | Wabash | 1,714 |
| 2 | Owen | 1,316 | 5 | Sullivan | 1,429 |
| | Rush | 1,422 | | Warren | 1,412 |
| 3 | Clay | 1,456 | 6 | Darke | 1,535 |
| | Edwards | 1,266 | | Mercer | 1,442 |
| | Effingham | 1,429 | | Pulaski | 1,406 |
| | Gallatin | 1,053 | | | |
| | Hamilton | 1,200 | | | |
| | Richland | 1,534 | State of Illinois | | $2,181 |
| | Wayne | 1,421 | State of Indiana | | 1,832 |
| | White | 1,443 | State of Ohio | | 1,957 |

1/ Counties having average aggregate income of $400 or more below the state per capita aggregate incomes during 1960.
SOURCE: U.S. Bureau of the Census, County and City Data Book, 1967.

## 31. REGIONAL DEVELOPMENT THROUGH REDUCED FLOOD LOSSES

The dominant economic endeavor of the counties listed in table C–51 is agricultural production. In order to enhance agricultural pursuits and thus the flow of income through these counties a further reduction in flood damages over that reduction in National Income Efficiency would be beneficial. All of the flood control reduction elements and projects in the NIE plan will also be analyzed in authorization and other more detailed planning reports to determine if regional objectives could be partially met by increasing the flood control performance. Those projects which may fit into this category are listed in tables C–52 and C–53.

## 32. REGIONAL DEVELOPMENT THROUGH CONSUMPTIVE WATER USE

It is well established that some water using industries are attracted to specific locations due to the availability of water among other things. An example of this is the electric generating industry with its locational flexibility wherein its locational decisions are predicted primarily on market accessibility, raw resource availability, labor availability and water availability. These precepts are equally applicable to other types of industries. Those areas generally conducive to electrical generating development and other industries are indicated in plate C–2. A number of projects in the National Income Efficiency Plan can be modified to increase these opportunities, if needs are indicated. Institutional efforts should be expanded to encourage this industrial dispersal in the interest of upgrading the economic balance between agricultural pursuits and industry or manufacturing.

TABLE C–52. SMALL WATERSHED PROJECTS WHICH ARE CONSIDERED TO HAVE REGIONAL SIGNIFICANCE

| Subbasin | County | Project name |
|---|---|---|
| Embarras | Clark, Crawford and Jasper, Illinois | North Fork Embarras |
| Lower Wabash | Posey, Vanderburg | Big Creek |
| Upper Wabash | Mercer, Ohio<br>Adams and Jay, Indiana | Buckeye-Hoosier |
| East Fork of White | Orange and Martin | Lost River |
| East Fork of White | Jennings and Jackson | Upper and Lower Vernon Fork |
| East Fork of White | Bartholomew and Jackson | White Creek |
| Mid-Wabash | Bartholomew | Honey Creek |
| Lower Wabash | Richmond, Edwards and Wabash, Illinois | Bonpas Creek |

# TABLE C–53, POTENTIAL ECONOMIC ENHANCEMENT OF DEPRESSED AREAS

| Project | Economically depressed counties within 30 mile radius of project 1/ | Remarks |
|---|---|---|
| EARLY ACTION<br>Deputy Reservoir<br>Azalia Reservoir | Jennings, Scott, Washington, Brown | Both Deputy and Azalia Reservoirs lie near the center of the geographical triangle bounded by the growing metropolitan areas of Indianapolis, Louisville and Cincinnati. The North Vernon, Indiana area has been identified as a potential location for a regional, international airport serving these cities with an interconnected rapid transit system supplementing the existing network of interstate highways. Future economic growth attendant to such development would be much in dependence upon these reservoir projects as a source of municipal and industrial water supply and for recreational use. Both projects have the potential for 50 to 75 percent expansion of their present planned capacity. |
| Parker Reservoir | Rush, Darke and Mercer, Ohio | Although this reservoir is formulated for maximum possible capacity as an early action project, possible reallocation of storage could provide for greater recreational potential for the project which would stimulate economic growth in the neighboring Ohio counties at the expense of reduced flood control and water quality benefits for the stream reaches below the dam in Indiana. A possibility exists for utilization of storage space in the divide area between New Castle and Muncie, transferring water from Parker Reservoir by channel during high stages and pumping at other times. Storage would be utilized for water quality and water supply at either of the cities noted above. Economic and institutional conflicts in such an arrangement have not been evaluated at present. |
| Crawfordsville Reservoir | Warren | Border line case; project would not likely improve the economic life of Warren County, most of which lies 35–45 miles to the north west. |
| Salt Fork Reservoir | Vermilion, Edgar, Douglas, Warren | Danville, Illinois represents the dominate trading center for most of the population of these four counties. The recommended Salt Fork Reservoir, centrally located to this four-county area, can stimulate industrial growth for the Danville area. While the project is presently planned for utilization of the full site capability, future water supply and recreation needs attendant to industrial growth in the area can be satisfied by readjustment and reallocation of present planned usage. |
| Levee Unit 2, Little Wabash R | Wayne, Edwards, White | Protects 7,360 acres of agricultural lands. |
| Levee Unit 7, Little Wabash R | Wayne, Edwards, White | Protects 7,010 acres of agricultural lands. |
| Levee Unit 8, Little Wabash R | Wayne, Edwards, White | Protects 13,400 acres of agricultural lands. |

## TABLE C–53. POTENTIAL ECONOMIC ENHANCEMENT OF DEPRESSED AREAS (CONTINUED)

| Project | Economically depressed counties within 30 mile radius of project 1/ | Remarks |
|---|---|---|
| LONG RANGE<br>Coal Creek Reservoir | Warren and Vermillion (Indiana), Edgar (Illinois) | The Coal Creek Reservoir is physically capable of being expanded about 15 percent in event the need for additional storage for recreation or other use is foreseen before construction is initiated. Warren and Vermillion Counties (Indiana) should profit from the leisure-recreation business which could be expanded from the base complex of the authorized Big Pine Reservoir and Coal Creek Reservoir and the natural areas of northwest Fountain County, all of which would be served by the recommended Wabash Scenic Parkway and Trail System. Northeastern Edgar County, Illinois may realize some economic stimulus from possible industrial growth attracted by the reservoir-recreation system outlined above. |
| Deer Creek Reservoir | Warren, Pulaski | These counties are unlikely to economically benefit from construction of Deer Creek Reservoir in that they are somewhat distant from the project area and are more geographically oriented to the existing developments on Tippecanoe River and the western Wabash region. The authorized Big Pine Reservoir is located in Warren County and its construction can be expected to accelerate economic growth of the county. The Deer Creek Reservoir is presently planned for development of maximum site capability in order to accommodate the water resource needs of the affected area. |
| Maltersville Reservoir | Dubois, Daviess, Martin, Orange, Pike | These counties have, based on 1960 dollars, an average of approximately 27 percent less per capita income than the Indiana average for 1960. Construction of the authorized Patoka Reservoir and the recommended Maltersville Reservoir can create long term industrial expansion for this five county area which has depended heavily on the agricultural and wood processing industries for employment. Considerable growth of travel and traditionally recreational oriented businesses can be expected in the communities near the proposed environmental fishery corridors which, in turn, will be enhanced by regulated releases from these reservoirs. |
| Martinsville Reservoir | Brown, Owen | Construction of the Martinsville Reservoir (Upper site) during the long range program should further increase the existing tourism recreation segments of the local economy in Brown County. Access to the Brown County State Park-Martinsville Reservoir complex would be improved by reconstruction and/or realignment of State Roads 135 and 252. Owen County would enjoy substantially reduced flood threats in the reaches of White River which flow through the county, especially in the Spencer area, and could expect dependable releases from Martinsville Reservoir for low flow control and industrial municipal use. The Owen County area also lies along an important transportation artery (State Road 67) which will bring recreationists through the county to the Martinsville project from southwestern Indiana. Owen County also lies in an advantageous location between the constructed Cagles Mill and Monroe Resevoirs. |

1/ Counties having average aggregate income of $400 or more below the State per capita aggregate income during 1960.

## 33. REGIONAL DEVELOPMENT THROUGH "NEW COMMUNITY DEVELOPMENT"

As the population of the basin increases from the present 3,500,000 to some 6,500,000 (projected for the year 2020) it becomes imperative that population numbers and distribution be brought in close harmony with the available land and resource base. As the population doubles new cities or regional centers will develop and desirably so. These regional centers need to be planned with these objectives in mind.

a. Developing residential areas in closer proximity to the employment area in order to cut down on commuting time, commuting distance, and the introduction of foreign material into the atmosphere.

b. Develop environmental centers in close proximity to the residential areas so that the public or that segment of the public that so desires may enjoy a tranquil atmosphere not too far from their residence.

c. Limiting the size of the "regional centers" by effecting planning and zoning to that which is conducive to administration, harmonious with the resource base and efficient in the use of resources.

Plate C–2 indicates areas which should be considered for regional centers. These areas have excellent availability to transportation routes, sufficient available resource base and sufficient water. The areas represent suggestions and detailed analysis would need to be made to ascertain for certain their adaptability.

## 34. REGIONAL DEVELOPMENT THROUGH IMPORT OF FINANCES

The preceding regional development precepts are regionally internal. There are certain concepts which are a combination of regional internal-external precepts. This involves an interaction between regions. One of the traditional precepts has to do with tourism and the economic activity stimulated thereby. The National Income Efficiency Plan provides a base which if properly utilized can stimulate an inflow of dollars into all of the economic subareas (if not inflow of dollars the plan at least tends to minimize the outflow of such dollars). In addition to the traditional recreation activities and their inherent financial flow, the Plan Formulation Subcommittee determined that there was a need for a central Wabash focus. This resulted in development of a broad plan of recreational development entailing consideration of the natural lake recreational developments existing in the upper portion of the basin, together with consideration of the Hoosier Lake National Recreation Area in the traditionally depressed south-central knobs area of southern Indiana. The latter could be developed in conjunction with other existing and planned recreational enterprises in the general area. These areas would be knit together by development of a Wabash Scenic Parkway and Trail system as depicted on Plate C–2. The system could focus on the Wabash River and contiguous features as part of the early development of mid-America and provide a central theme for the many attractions of the basin including historic, natural, archaeological and cultural features together with a broad, water oriented recreational system. The parkway and trail system and the considered Hoosier National Recreational Area with attendant areas, could provide a mecca for many Americans and could effect an imposed regional posture through importation of outside financial resources by sound promotion of the attributes of the area.

## SECTION VII – MODIFICATION OF THE NATIONAL INCOME EFFICIENCY AND REGIONAL DEVELOPMENT PLAN IN THE INTEREST OF PRESERVATION AND ENHANCEMENT OF THE ENVIRONMENT

### 35. GENERAL

The present concern with the quality of the Nation's environment is long overdue. As the Nation expanded to its present population of over 200 million, a great abuse of natural resources was experienced. As long as the population levels were considerably lower than at the present we thought we had sufficient environmental resources to satisfy everyone. Then the day of awakening; it dawned that we were using and abusing resources faster than they could be replaced. As we cut our forests, overtilled soil, drained wetlands, abused the assimilation capacity of our streams and atmosphere, we created conditions that if not corrected, will deprive this generation and future generations of their rightful heritage. Thus today's society is attempting to right some of these environmental wrongs. This attempt is exemplified by a myriad of recent legislation such as the National Environmental Policy Act of 1969 – The Water Pollution Control Act – The Air Pollution Control Act and others. All of these are more of a corrective nature than of a protective and preservative nature. The Plan Formulation Subcommittee determined that we should fully implement the corrective laws in our plan. For maximum, long term benefits protective and preservative measures will have to be effected.

### 36. ENVIRONMENTAL CORRIDORS

To the plan for National Income Efficiency and Regional Development we decided to add Environmental Corridors. These environmental corridors were of two types:

#### a. Rural

The rural environmental corridors selected represent the best of the stream environment that remains in the basin. Man in his normal productive pursuits has expropriated a great amount of the natural stream environment and converted it to other uses. The rural environmental corridors concept is depicted by figure C–2.

It is anticipated that much of the desired functional use of the stream corridor can be achieved by acquisition of scenic easements rather than acquisition by fee title. At selected places, however, a limited amount of fee title would need to be acquired to assure the public's right to ingress and egress. We concluded that the most expeditious administration of these areas could be performed by the states in which they are located in concert with the State Comprehensive Recreation Plan prepared in response to the Land and Water Conservation Fund Act. The recommended stream corridor system is shown on plate C–2. The length of corridor for each of the subareas is shown in table C–54.

#### b. Urban Corridors

Urban corridors were considered and selected in an effort to bring environmental opportunities to the public in some close proximity to their place of residence. The urban corridor may have low absolute environmental variety within the urban communities. They may be the only significant green areas that could and should break up the development monotony that exists.

We do not conclude that the urban corridors can be developed, designated and acquired as rapidly as can the rural corridors but we believe they represent a longer term

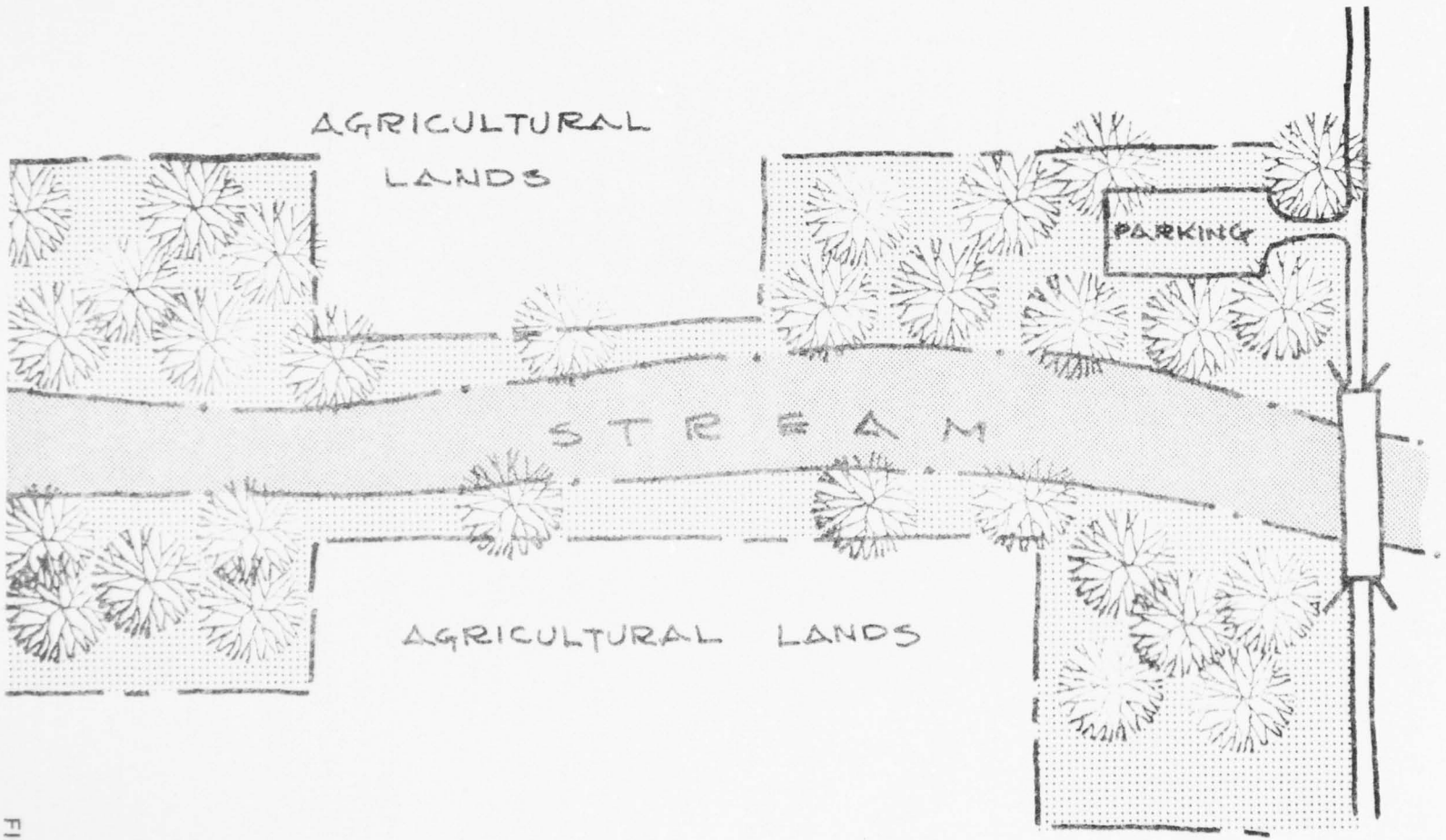



FIGURE C-2

CONCEPTUAL ENVIRONMENTAL
STREAM CORRIDOR
RURAL SETTING

TABLE C–54. ENVIRONMENTAL STREAM CORRIDORS CONSIDERED FOR THE EARLY ACTION PLAN

| Economic subarea | Environmental stream corridor |
|---|---|
| | (miles) |
| 1 | 406 |
| 2 | 261 |
| 3 | 109 |
| 4 | 186 |
| 5 | 251 |
| 6 | 460 |
| TOTAL | 1,673 |

objective which could significantly contribute to an improvement in the quality of living in our urban areas. An example of the concept of urban corridors is illustrated by figure C– 3. The communities for which detailed corridor plans should be developed are listed in table C–55.

### c. Why Environmental Corridors

The corridors were conceived to serve a number of objectives, namely:

(1) Protect and preserve the stream areas which in many instances provide the only remaining opportunities for plant and animal life generally requiring stream side or stream access conditions.

(2) Minimize future flood damages by precluding developments or changed land use in the portion of flood plains covered by the corridors.

(3) Identify the best of the stream environments so that those environmentally conflicting developments which by their nature need to be contiguous to streams can be located in more environmentally compatible areas.

TABLE C–55. PRIORITY LIST OF COMMUNITIES FOR WHICH DETAILED ENVIRONMENTAL CORRIDOR PLANS SHOULD BE DEVELOPED

| Economic subarea | Community | Economic subarea | Community |
|---|---|---|---|
| 1 | Columbus, Indiana | 5 | Crawfordsville, Indiana |
| 2 | Anderson, Indiana | | Kokomo, Indiana |
| | Indianapolis, Indiana | 6 | Logansport, Indiana |
| | Muncie, Indiana | | Peru, Indiana |
| | Shelbyville, Indiana | | Wabash, Indiana |
| 3 | Lawrenceville, Illinois | | Marion, Indiana |
| | Danville, Illinois | | |

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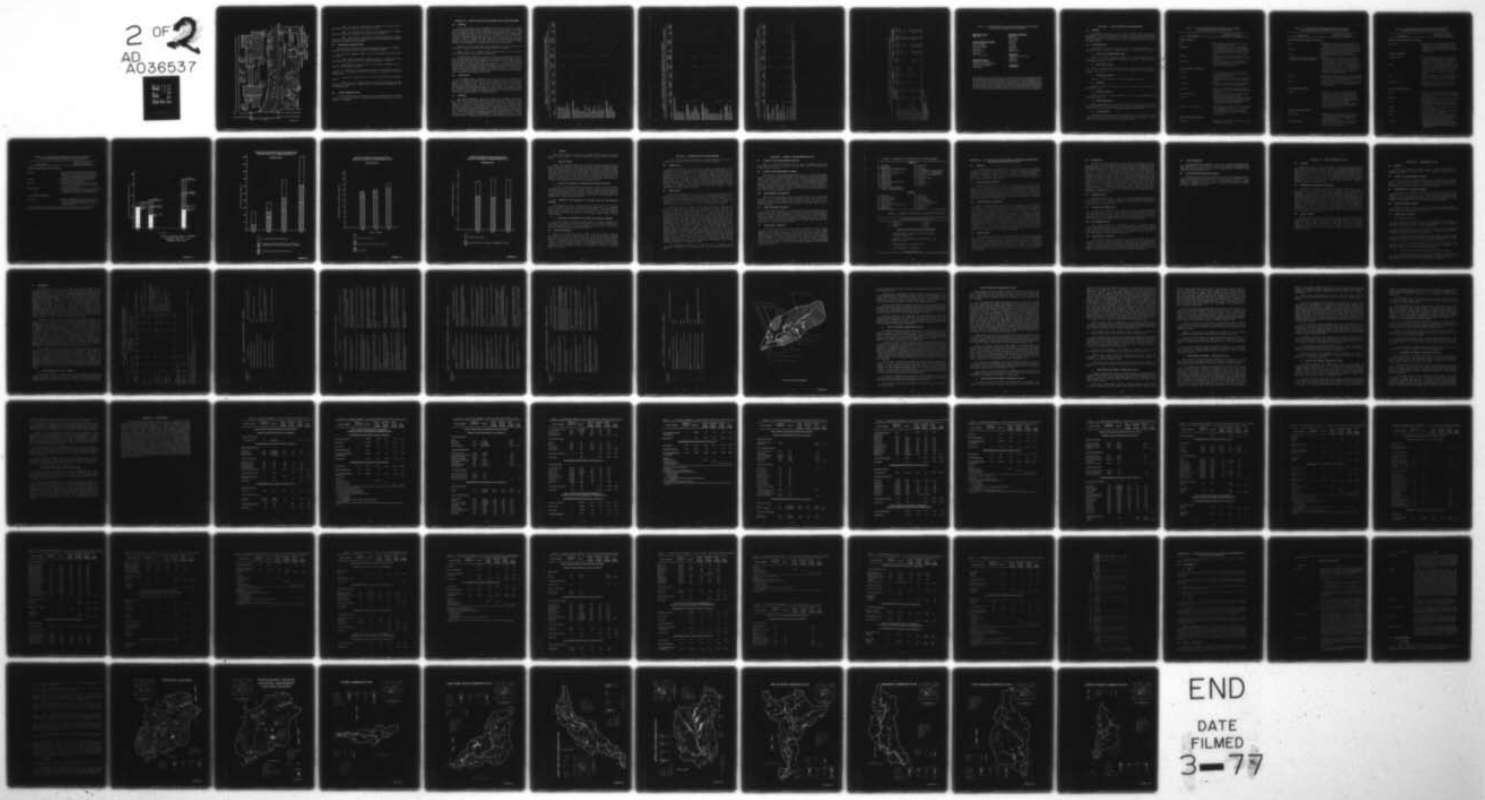

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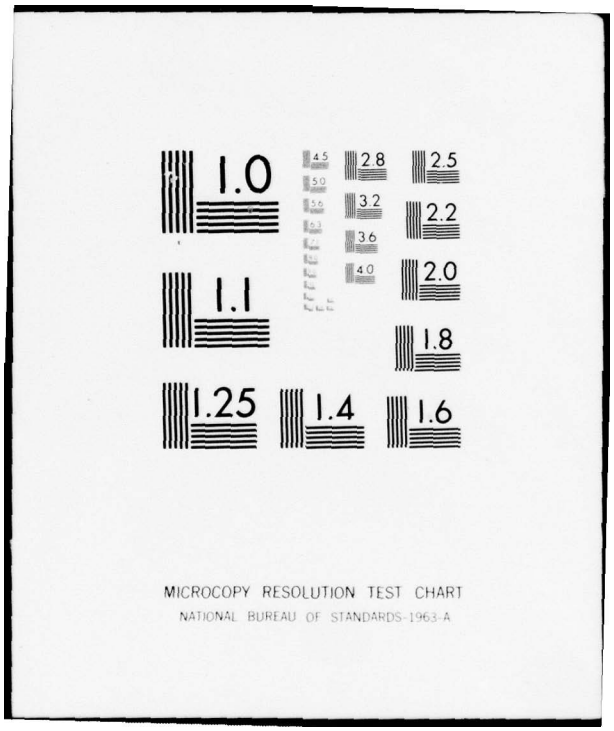
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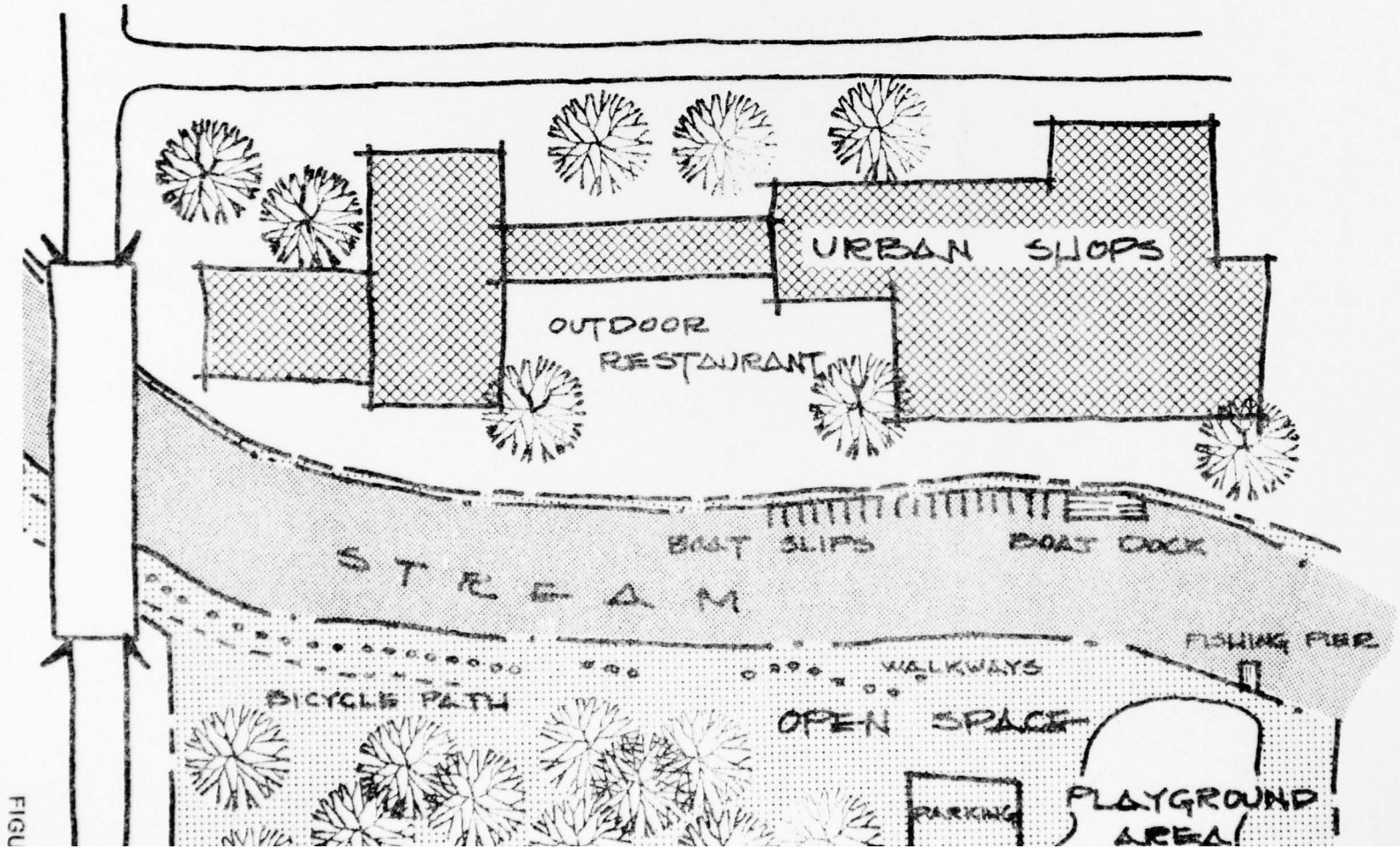

URBAN SHOPS
OUTDOOR
RESTAURANT
BOAT SLIPS
BOAT DOCK
STREAM
FISHING PIER
WALKWAYS
BICYCLE PATH
OPEN SPACE
PARKING
PLAYGROUND
AREA

FIGU

**(4)** Be a part of an initial effort for a National Land Use policy. Most all land areas are related in some way to the basin's stream system.

**(5)** By acquiring scenic easements the riparian rights of contiguous owners can be preserved and existing uses of the land can be continued.

**(6)** The corridors are anticipated to require acquisition of an estate on about 40 acres of land per mile. It is further anticipated that some 80,000 acres would be involved at a total cost of about $100 million.

## 37. STRUCTURAL MODIFICATIONS

Almost without exception the structural developments proposed were modified to some extent in the interest of the environment. Those changed included:

**a.** Provision of additional storage in lieu of channel improvements when feasible in watersheds.

**b.** Where channel modification is necessary confine it to one side of the stream where feasible, thus retaining some of the environmental alternatives of the area.

**c.** Establishment of riffles and pools in some channel modification plans to preserve or enhance the fishery resource.

**d.** As a part of channel modification any oxbow areas should be maintained and managed along with adjacent land areas for preservation and enhancement of fish and wildlife habitat.

**e.** Adjustment of damsite locations to avoid or minimize adverse environmental impact.

**f.** Where there were conflicts between environmental corridor areas and levee developments the levees were set back from the river to accommodate establishment of the environmental corridor.

## 38. OTHER CONSIDERATIONS

The Flood Plain Management Element and the Land Treatment Element are oriented toward the environment as much as toward National Income Efficiency and have been presented in the NIE plan.

## SECTION VIII – CONFLICTS WITH PLAN ELEMENTS AND OTHER PROGRAMS

### 39. GENERAL

The conflicts of the plan as developed to this point are related more toward conflicts between developments and the environment than any other aspect. It is inevitable that all developments such as channel improvement, sewage treatment plants and other types of development conflict to some extent with the preservation of the existing natural environment. The only thing that can be done is to attempt to minimize conflicts and to assure that undisturbed environmental values be protected and preserved by the use of such alternatives as may be possible. The other aspect has to do with conflicts with other programs. We have attempted to minimize the conflicts with other programs by taking account of those programs in the selection of projects to meet main objectives.

There are very few conflicts with other programs that cannot be minimized or eliminated in authorization and other detailed studies when they are undertaken.

Table C–56 lists conflicts between structural elements of the early action and long range portions of the plan and the environment.

The Wabash River Basin plan is a part of the Ohio River Basin plan and as such we have compared economic and other projections for the plan with the Ohio Basin review. It should be remembered that the consideration in the Ohio River review in some instances was the reduction of flood damages along the main stem of the Ohio River. In the Wabash study, we have attempted to reduce flood damages in the Wabash basin rather than using the Ohio River main stem as the prime consideration; therefore, some modification or change from the storage estimates presented in the Ohio River basin review are necessary. Table C–57 presents a comparison of flood control projects formulated for the Ohio River and the Wabash River Basin Comprehensive Studies.

### 40. NAVIGATION

As mentioned earlier, a navigation study is being conducted to determine the feasibility of providing a navigable waterway from the Ohio River up the Wabash to various points on the Great Lakes. The study has not progressed sufficiently to conclude its feasibility or desirability; however, there have been three tentative routes selected for study. We have taken these three routes and tested to see what impact they would have on the plan developed for the Wabash River basin. Some projects and some environmental corridor areas would be affected. Table C–58 indicates those elements of the plan which would be affected by the various navigation routes being considered.

### 41. SUMMARY

The conflicts summarized in this section represent the best analysis at this time of the conflicts between the program elements. The conflicts between various elements of the plan (such as watersheds versus major reservoirs, etc.) have been resolved. The other conflicts are related to the basic conflicts between objectives such as national income efficiency versus protection and preservation of the environmental quality. The latter types are always inevitable since increased production of goods and services for human needs always impacts the environment in some way. As we have stated before, our objective is not to eliminate production of needed goods and services or to protect and preserve existing environment, but to provide for the production of needed goods and services and at the same time attempt to minimize the adverse impact on the environment. Now how can this

# TABLE C-56. POTENTIAL CONFLICTS AND OPPORTUNITIES FOR DEVELOPMENT OF ENVIRONMENTAL FEATURES WITH PROJECTS RECOMMENDED FOR EARLY ACTION PLAN

| Project | Natural areas[1] | Historical sites[1] | Archaeological sites[1] | Covered bridges[1] | Environmental stream corridors | Principal fishing streams[2] | State forests | State fish and game areas | State parks | National forests |
|---|---|---|---|---|---|---|---|---|---|---|
| **Patoka River Subbasin** | | | | | | | | | | |
| Patoka Levee Unit 2 | | | | 2 | 1 | 1 | | | | |
| Patoka Levee Unit 3 | | | | 2 | 1 | 1 | | | | |
| Patoka Levee Unit 4 | | | | | 1 | 1 | | | | |
| Patoka Levee Unit 5 | | | | | 1 | 1 | | | | |
| Patoka Channel Improvement | | | | | 1 | 1 | | | | |
| Upper Patoka Watershed | | | | | | | | | | 1 |
| Hall-Flat Creek | | | | | | | 1 | | | |
| **East Fork White River Subbasin** | | | | | | | | | | |
| Azalia Reservoir | | | | 1 | | 1 | | | | |
| Deputy Reservoir | | | | | | 1 | | | | |
| Columbus West Levee | | | | | 1 | 1 | | | | |
| Wiemeyer Levee | | | | | 1 | 1 | | | | |
| Beatty Levee | | | | | 1 | 1 | | | | |
| Levee Unit 5 | | | | | 1 | 1 | | | | |
| Levee Unit 17 | | | | | | 1 | | | | |
| Aikman Creek Watershed | | | | | | | | 1 | | |
| Lost River | 4 | 2 | | | 1 | 1 | | 1 | | 1 |
| Upper Vernon Fork | 5 | | | | 1 | 1 | | 2 | 1 | |
| Lower Vernon Fork | | 1 | | | 1 | 1 | | | | |
| Pond Creek | | | | | | | 1 | | | |
| Little Salt Creek | | | | | 1 | | | | | 1 |
| White Creek and Beatty Walker Ditch | | | | | 1 | | | | | 1 |
| Lewis Creek | 1 | | | 1 | | | | | | |
| Upper Big Flatrock River | | | | 2 | | | | | | |
| Delaney Creek | | | | | | | 1 | | | |
| Brandywine Creek | | 1 | | | 1 | 1 | | | | |
| Little Blue River | | 2 | 1 | | 1 | 1 | | | | |
| **West Fork White River Subbasin** | | | | | | | | | | |
| Parker Reservoir | | | | 1 | | 1 | | | | |
| Fall Creek Reservoir | | | | | 1 | 1 | | | | |
| Black Creek Watershed | | | | | | | 1 | | | |
| Jordan Creek | | | | | | | 1 | | | |
| Deer Creek | | | | 2 | | | | | | |

## TABLE C–56. POTENTIAL CONFLICTS AND OPPORTUNITIES FOR DEVELOPMENT OF ENVIRONMENTAL FEATURES WITH PROJECTS RECOMMENDED FOR EARLY ACTION PLAN (CONTINUED)

| Project | Natural areas[1] | Historical sites[1] | Archaeological sites[1] | Covered bridges[1] | Environmental stream corridors | Principal fishing streams[2] | State forests | State fish and game areas | State parks | National forests |
|---|---|---|---|---|---|---|---|---|---|---|
| West Fork White River Subbasin (Cont'd) | | | | | | | | | | |
| Little Walnut | 1 | | | 3 | | | | | | |
| Rattlesnake Creek | | | | | | | 1 | | | |
| Bryant Creek | | | | | | | 1 | | | |
| Whitelick Creek | | | | | 1 | 1 | | | | |
| Killbuck Creek | | | | | 1 | 1 | | | | |
| Wilson Creek | 2 | | | | | | | | | |
| Upper Wabash River Subbasin | | | | | | | | | | |
| Clear Creek Watershed | 1 | | | | | | | | | |
| Little River | 2 | | 1 | | | | | | | |
| Buckeye Hoosier | | | | | 1 | 1 | | 1 | | |
| Salamonie River | 1 | | 1 | | 1 | 1 | | | | |
| Lower Mississinewa River | 1 | | | 1 | 1 | 1 | | | | |
| Upper Mississinewa River | 1 | | | 1 | 1 | 1 | | | | |
| Big Monon Ditch | | | | | | | | 1 | | |
| Sugar Creek | | | 1 | | | | | | | |
| Middle Wabash River Subbasin | | | | | | | | | | |
| Crawfordsville Reservoir | 1 | | | 1 | 1 | 1 | | | | |
| Salt Fork Reservoir | | | | | 1 | 1 | | | | |
| City Ditch Watershed | | 8 | 1 | | | | | | | |
| Snapp-Kelso | | | | | | | | | 1 | |
| Turtle Creek | | 2 | 1 | | | | | | | |
| Mill Creek | | | | | 1 | 1 | | | 1 | |
| Honey Creek | | | | 1 | | | | | | |
| Sugar Creek | | | | | 1 | 1 | | 1 | | |
| Otter Creek | 1 | | | | | | | | | |
| Coal Creek | 1 | | | 2 | 1 | 1 | | | | |
| Fall Creek | 2 | | | | | | | | | |
| Big Raccoon Creek | | | | 1 | 1 | 1 | | | | |
| Lye Creek | 2 | | | | | | | | | |
| Embarras River Subbasin | | | | | | | | | | |
| Brushy-Birch Creek Watershed | | | 1 | | | | | | | |
| Muddy Creek | | | | | | | | | 1 | |
| North Fork Embarras River | 2 | | | | 1 | 1 | | | | |
| Muddy Creek | | | | | 1 | 1 | | | | |

## TABLE C-56. POTENTIAL CONFLICTS AND OPPORTUNITIES FOR DEVELOPMENT OF ENVIRONMENTAL FEATURES WITH PROJECTS RECOMMENDED FOR EARLY ACTION PLAN (CONTINUED)

| Project | Natural areas 1/ | Historical sites 1/ | Archaeological sites 1/ | Covered bridges 1/ | Environmental stream corridors | Principal fishing streams 2/ | State forests | State fish and game areas | State parks | National forests |
|---|---|---|---|---|---|---|---|---|---|---|
| Little Wabash River Subbasin | | | | | | | | | | |
| Levee Unit 7 | | | | | 1 | 1 | | | | |
| Levee Unit 8 | | | | | 1 | 1 | | | | |
| Fox River Watershed | 2 | | | | 1 | | | | | |
| Upper Little Wabash River | 3 | | | | 1 | 1 | | | | |
| Lower Wabash River Subbasin | | | | | | | | | | |
| Levee Unit 50 | | | | | 1 | 1 | | | | |
| Big Creek Watershed | | | 1 | | 1 | 1 | | | | |
| Gresham Creek | | 1 | 1 | | | | | | | |
| Scott Ditch and Coffee Bayou | 3 | | | | | | | | | |
| Bonpas Creek | 1 | | | | 1 | 1 | | | | |
| Total Structural Projects | 20 | 7 | 9 | 14 | 38 | 39 | 7 | 6 | 4 | 4 |
| Total Environmental Items | 37 | 27 | 9 | 21 | 38 | 39 | 7 | 7 | 4 | 4 |

1/ Location taken from map prepared by Outdoor Recreation, Fish and Wildlife and Environmental Task Force. Probably this is not a complete list.
2/ Does not include all spawning areas upstream from the fishing stream.

TABLE C–57. COMPARATIVE ANALYSIS AND SUMMARY OF WATER RESOURCES PROGRAMS IN WABASH BASIN

| Purposes | Requirements as projected by Ohio River Comp Study for Wabash Basin 1/ 2/ | | Major impoundments | | | Watersheds | | | Summary of quantities in Plan | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 2020 | Authorized Dec 1968 | Early action 1980 | Long range 2020 | Authorized Dec 1968 | Early action 1980 | Long range 2020 | Early action 1980 5/ | Long range 2020 |
| Flood Control (1,000 acre feet) | 4,000.0 | 14,656.0 | 1,750.4 | 2,231.2 | 3,453.1 | 101.2 | 696.3 | 906.0 | 2,927.5 | 4,359.1 |
| Water Quality (1,000 acre feet) | 1,388.7 | 2,622.4 | | 253.0 | – | 2.5 | 84.8 | – | 337.8 | – |
| (Conservation Use) 4/ | | | (434.3) | | | | | (106.8) | (434.3) | (541.1) |
| Water Supply (1,000 acre feet) | 441.0 | 1,129.5 | | 111.7 | – | 8.6 | 68.0 | – | 179.7 | – |
| Local Protection (Miles) | 85 | 272 | 312.1 | 371.1 | 386.1 | – | – | – | 371.1 | 386.1 |
| Outdoor Recreation (million recreation days) | 73.2 | 196.1 | 10.0 | 23.6 | 36.7 | 0.9 | 6.8 | 9.1 | 30.4 | 45.8 |
| Watershed Land Treatment (1,000 acres) | 4,012.7 | 11,290.6 | – | – | – | 802.0 | 9,235.0 | 14,335.0 | 9,235.0 | 14,335.0 |
| Channel Improvement (miles) | 568 | 1,701 | 7 | 42.5 | – | 510.5 | 1,946.2 | 2,513.6 | 1,988.7 | 2,513.6 |
| Irrigation (1,000 acres) | 75.4 | 472.8 | – | – | – | 13.8 3/ | 35.8 3/ | 78.3 3/ | 35.8 | 78.3 |
| Drainage (1,000 acres) | 2,184.0 | 2,819.0 | – | – | – | – | 206.8 | 292.6 | 206.8 | 292.6 |

1/ Requirements in addition to that provided by existing (1965) programs.
2/ Amounts are accumulative for all columns.
3/ Irrigation existing and/or expected.
4/ Includes both water supply and water quality control storage.
5/ Includes ongoing program.

TABLE C– 58. COMPREHENSIVE PLAN ELEMENTS WHICH MAY BE AFFECTED BY THE CROSS–WABASH VALLEY WATERWAY

**Major Reservoir Projects**
Delphi, Upper

**Levees and Local Protection Projects**
Levee Unit 2, Wabash
Levee Unit 5, Wabash
Levee Unit 50, Wabash
Niblack Levee
Gill Township Levee
Island Levee
Greenfield Bayou Levee

**Environmental Corridors**
Montezuma, Ind. to Attica, Ind.
Logansport, Ind. to Huntington, Ind.
Danville, Ill. to Wabash River
At Lake Shafer

**Upstream Watershed Projects**
Black River
Busseron Creek
Turman Creek
Prairie Creek
Coal Creek
Goose Creek
Coal Branch
Little River
Big Monon Ditch

**Natural Areas**
Old Dam, New Harmony Cut-off
The Rapids
Hanging Rock
Big Four Cut

**Historical Sites**
Grand Rapids

be done? Basically by assuring in the array of alternatives that there are environmental oriented alternatives that may distress the efficiency objectives and then in making investment decisions give equal weight to environmental protection as to other objectives. The great difficulty is not in the area of goals or objectives but rather in developing an acceptable methodology whereby environmental values may be explicitly imputed into the decision making model. In the absence of specific methodology many objectives outside of the National Income Efficiency objective will be based on personal preference and thus strongly subjective rather than articulate and objective.

## SECTION IX – PLAN EFFICIENCY AND DEFICIENCIES

### 42. GENERAL

As indicated in Section II there were a number of needs to which the plan would be addressed or which we were trying to eliminate. The best way of determining plan efficiency is to analyze how well the plan meets those needs. Accordingly, where the needs have been tabulated we will retabulate them to show how effective the plan is in meeting the indicated needs.

### 43. PLAN EFFICIENCY

In analyzing the efficiency of the plan we decided to compare the products of the plan with the needs as previously established. Analysis on a need by need basis as follows:

#### a., Municipal and Industrial Water Supply

Table C–59 indicates municipal and industrial water supply requirements and in each case how the needs for muncipal and industrial water supply can be met through the year 2020 for each point of need.

#### b. Water Quality Control

The plan as developed meets the water quality control objective in every instance where the water quality objectives can be met by storage and by advanced waste treatment at the source.

#### c. Flood Damage Reduction

Figure C-4 indicates efficiency of the plan in reducing flood damages.

#### d. Recreation

Figure C–5 indicates the efficiency of the plan in meeting recreation needs and demands in the basin.

#### e. Fishing and Hunting

Figures C–6 and C–7 shows the efficiency of the plan in meeting fishing and hunting demands in the basin.

#### f. Pristine Opportunities

Pristine opportunities as we have defined them in Section II will be met or nearly met by virtue of the environmental corridors which have been presented therein and by the implementation of the National Forest Program recommended in Appendix H.

#### g. Agricultural Water

Agricultural water requirements will be met by the plan by virtue of the structural elements of the plan. In many instances the agricultural water can be obtained from ground water without depletion or mining of the ground water.

TABLE C–59. EVALUATION OF OPTIMUM RESOURCE DEVELOPMENT TO MEET PROJECTED WATER SUPPLY NEEDS

| Problem area[1/] | Optimum resource plan considered for meeting needs |
|---|---|
| **PATOKA SUBBASIN** | |
| Jasper | Patoka Reservoir, under construction, can supply needs through study period. |
| Huntingburg | SCS reservoir P20-II, west of city, is most promising of available alternates. Program can furnish water to St. Anthony and Birdseye. Purchase of storage from Patoka Reservoir would be an alternate solution. |
| Ferdinand | SCS site P21-II on Green Creek, 1.3 miles north of town is cheaper source than Patoka River or Patoka Reservoir |
| Oakland City | Pumping from Patoka River to existing reservoir appears cheaper than development of well field 12 miles north in White River basin. |
| **EAST FORK WHITE SUBBASIN** | |
| New Castle | Development of ground water to 2010 with supplemental supply from four SCS reservoirs for remainder of study period. |
| Greenfield | Further development of existing ground water aquifers followed by expansion southward toward Big Blue River |
| Greensburg | Development of additional ground water followed by purchase of water from Downeyville Reservoir |
| Scottsburg | Additional water available from projects in Stucker Fork SCS project, Quick Creek Reservoir and Deputy Reservoir. |
| Vernon-North Vernon | Future needs through 2020 can be supplied by SCS structures in Vernon Fork watershed. |
| Orleans | Poor ground water availability due to Karst topography. Water can be made available from Mitchell, storage in Structure No. 2 (Lost River SCS project); and regional supply from Patoka Reservoir. |
| Paoli-French Lick-West Baden | Cheapest prospect appears to be storage in Lost River Watershed Project – Structures 11, 13, 14, and 15. A regional distribution of storage from Patoka Reservoir for these communities would likely be next favorable. |
| **WEST FORK WHITE SUBBASIN** | |
| Winchester | Development of one or more new well fields as needs develop is least cost plan |

TABLE C– 59. EVALUATION OF OPTIMUM RESOURCE DEVELOPMENT TO MEET PROJECTED WATER SUPPLY NEEDS (CONTINUED)

| Problem area[1/] | Optimum resource plan considered for meeting needs |
|---|---|
| **WEST FORK WHITE SUBBASIN (CONTINUED)** | |
| Muncie | Increasing pumped storage in Prairie Creek Reservoir, development of additional ground water and eventual use of storage in Parker Reservoir is lowest cost plan. |
| Anderson | Due to water quality needs downstream, Anderson should continue development of ground water resources with post-1980 needs supplied by Parker Reservoir. |
| Elwood | New well fields within ten miles or so are least cost solution. |
| Indianapolis Area (Includes Marion County and adjacent areas north and south) | Development of additional ground water to supplement existing surface impoundments will meet 98 percent of 1980 requirements. Additional early action needs to be met by Fall Creek Reservoir or other sources Post-1980 needs are expected to be satisfied by increased ground water, increased waste water return from up-stream communities and storage in Parker, Fall Creek, Big Walnut and Big Blue Reservoirs. (Total needs by 2020 projected to be 390 mgd) |
| Plainfield | Ground water development can satisfy needs through study period with alternatives from Big Walnut Reservoir (pipe line to Indianapolis) and SCS site 60-VIII. |
| Greencastle | Ground water available in Big Walnut Creek valley furnishes a least cost alternative to purchasing storage in Big Walnut Reservoir. |
| **UPPER WABASH SUBBASIN** | |
| Kokomo | Kokomo will be unable to meet its projected water supply needs from locally available ground and/or surface water resources. Future supplies may be drawn from ground water southwest of Kokomo or by reallocated storage from Mississinewa Reservoir. Reuse of waste water by industries as done at present, can extend supplies. Further sources may include reservoir supplies from Pipe Creek and Lafayette Reservoir. |
| **MIDDLE WABASH SUBBASIN** | |
| Crawfordsville | Expansion of well fields will meet 1980 needs; post-1980 needs can be met by developing storage in Crawfordsville Reservoir or by purchasing water from Mansfield Reservoir. |
| Georgetown, Illinois | Purchase of water from Danville or development of well field in Wabash River valley ten miles away appear to be the best prospects. |

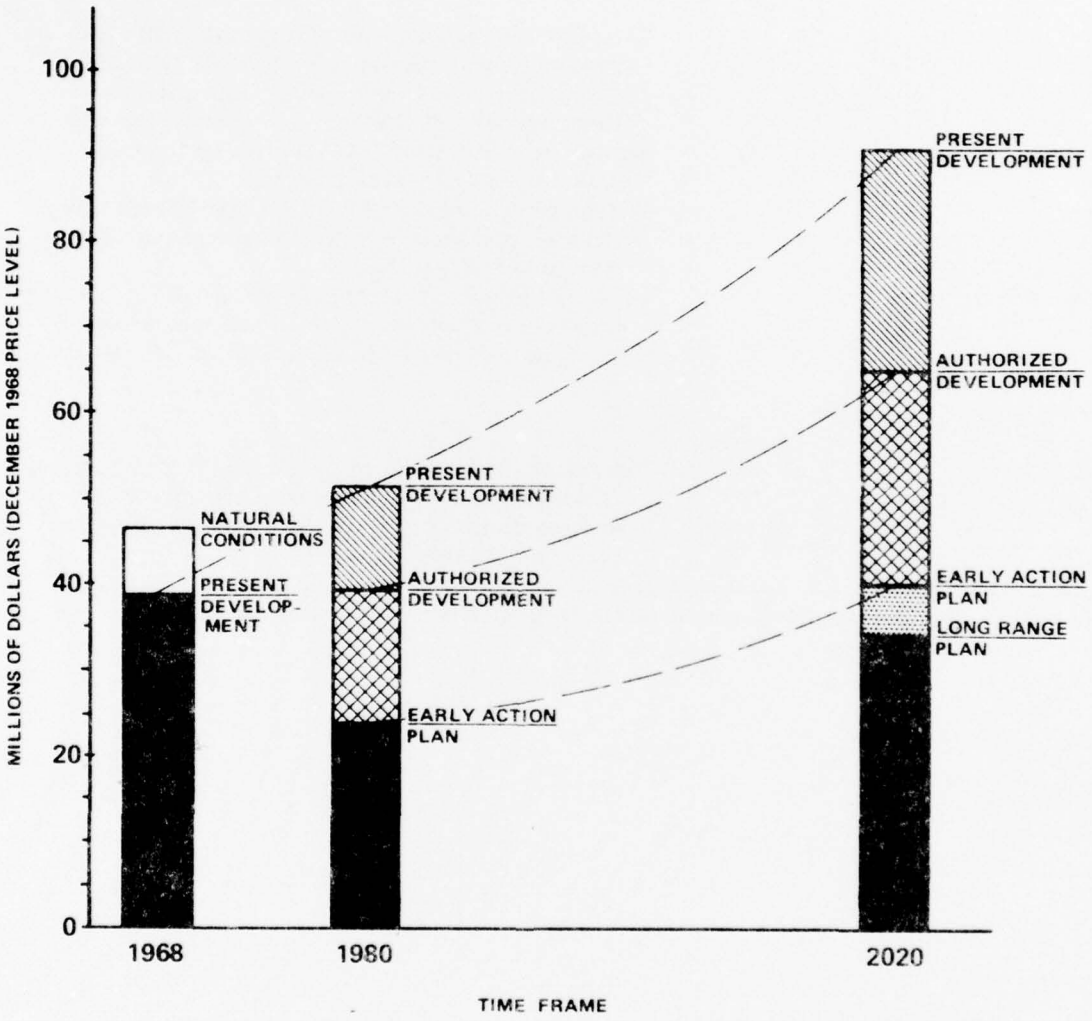
TABLE C–59. EVALUATION OF OPTIMUM RESOURCE DEVELOPMENT TO MEET PROJECTED WATER SUPPLY NEEDS (CONTINUED)

| Problem area[1/] | Optimum resource plan considered for meeting needs |
|---|---|
| MIDDLE WABASH SUBBASIN (CONTINUED) | |
| Paris, Illinois | Early needs can be met by storage in SCS site 44-I on Sugar Creek. Other possibilities include a well field in Wabash valley, piping surface water from Wabash River or obtaining storage from authorized Lincoln Reservoir. |
| EMBARRAS SUBBASIN | |
| Charleston, Illinois | Water purchased from authorized Lincoln Reservoir or from State identified reservoir site on Polecat Creek offer most feasible solution. SCS has also identified several potential sites in the area. |
| Casey | Present supply can meet needs through 1980. Further needs can be met by developing new well field west of Casey in the Embarras River valley, or by utilization of storage in SCS sites 11-I and 11-IV, or developing surface water supply from Embarras River. |
| Newton | Least cost alternative is to develop wells in Wabash valley east of Newton , use of flow in Embarras River,or use SCS reservoir sites in the area. |
| Arcola, Illinois | Well field expansion can provide needs to 1980 or 1990 with later alternative or water purchased from authorized Lincoln Reservoir. |
| LITTLE WABASH SUBBASIN | |
| Olney | City is presently developing a new reservoir on West Fork Fox River which will satisfy demand through study period. |
| Fairfield | Least cost future supply would be storage in authorized Lincoln Reservoir. |
| Cisne | Future supplies can be extracted from well fields in Raccoon Creek or Elm River valleys, each about five miles away. |
| Enfield | Well field development in Little Wabash valley offers best alternative source. |
| Clay City | Storage in authorized Louisville Reservoir offers best source to satisfy past 1980 needs. |
| Flora | Needs after 1980 can most cheaply be met by utilization of storage from authorized Louisville Reservoir. An alternative exists for development of an SCS identified reservoir site 43-II. |
| Louisville | Authorized Louisville Reservoir can furnish supply for post-1980 needs with alternative storage available from SCS identified site 44-IV on tributary of Panther Creek. |

TABLE C– 59. EVALUATION OF OPTIMUM RESOURCE DEVELOPMENT TO MEET PROJECTED WATER SUPPLY NEEDS (CONTINUED)

| Problem area[1/] | Optimum resource plan considered for meeting needs |
|---|---|
| LITTLE WABASH SUBBASIN (CONTINUED) | |
| Mattoon | Least cost alternative for satisfying post-1980 needs appears to be storage in SCS site 52-IV with other alternatives of purchasing water from Shelbyville Reservoir or from authorized Louisville Reservoir. |
| Altamont | Storage from SCS site 52-XVIII provides the least cost alternative for future needs. |
| Dieterich | Development of new well field in Little Wabash valley is a least cost solution with alternate of purchasing storage in SCS site 50-III. |
| Edgewood-Mason | Least cost solution to meet pre-1980 needs is to develop well field in Little Wabash valley with alternate of purchasing storage in SCS site 46-II on Dismal Creek. |
| LOWER WABASH SUBBASIN | |
| West Salem | Needs for post-1980 time frame can be met be purchase of additional water from nearby Albion or it can acquire storage in SCS site MS-100-X to be located on Crooked Creek. |

1/ Areas for which projected water supply needs cannot be met from locally available ground or surface water resources.




RESIDUAL AVERAGE ANNUAL DAMAGES
DECEMBER 1968 PRICE LEVEL
WABASH RIVER BASIN



FIGURE C-4

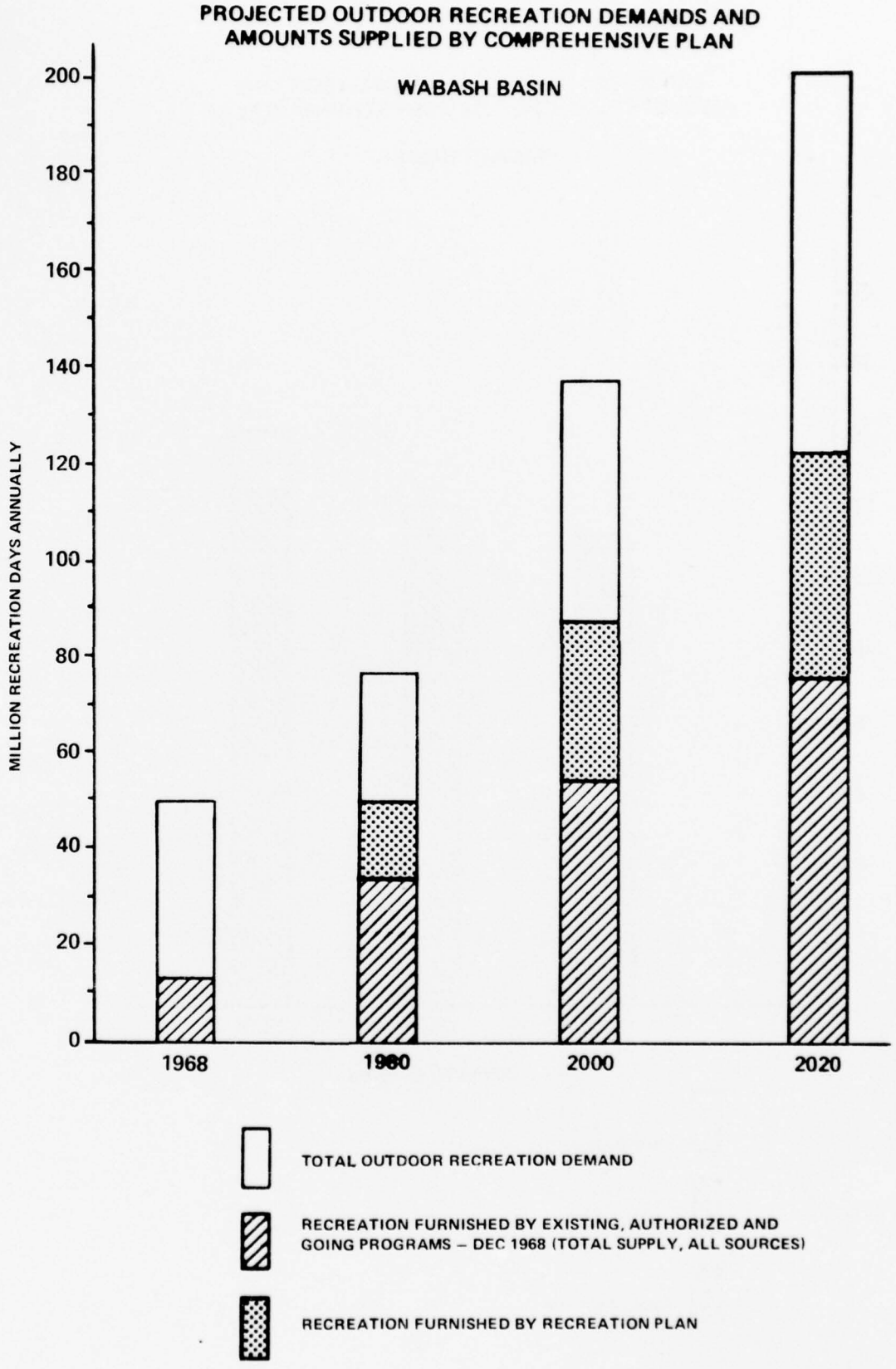

PROJECTED OUTDOOR RECREATION DEMANDS AND
AMOUNTS SUPPLIED BY COMPREHENSIVE PLAN
WABASH BASIN
MILLION RECREATION DAYS ANNUALLY
200
180
160
140
120
100
80
60
40
20
0
1968
1980
2000
2020
TOTAL OUTDOOR RECREATION DEMAND
RECREATION FURNISHED BY EXISTING, AUTHORIZED AND GOING PROGRAMS – DEC 1968 (TOTAL SUPPLY, ALL SOURCES)
RECREATION FURNISHED BY RECREATION PLAN



FIGURE C-5

PROJECTED GROSS FISHING DEMANDS AND
AMOUNTS FURNISHED BY COMPREHENSIVE PLAN

WABASH BASIN

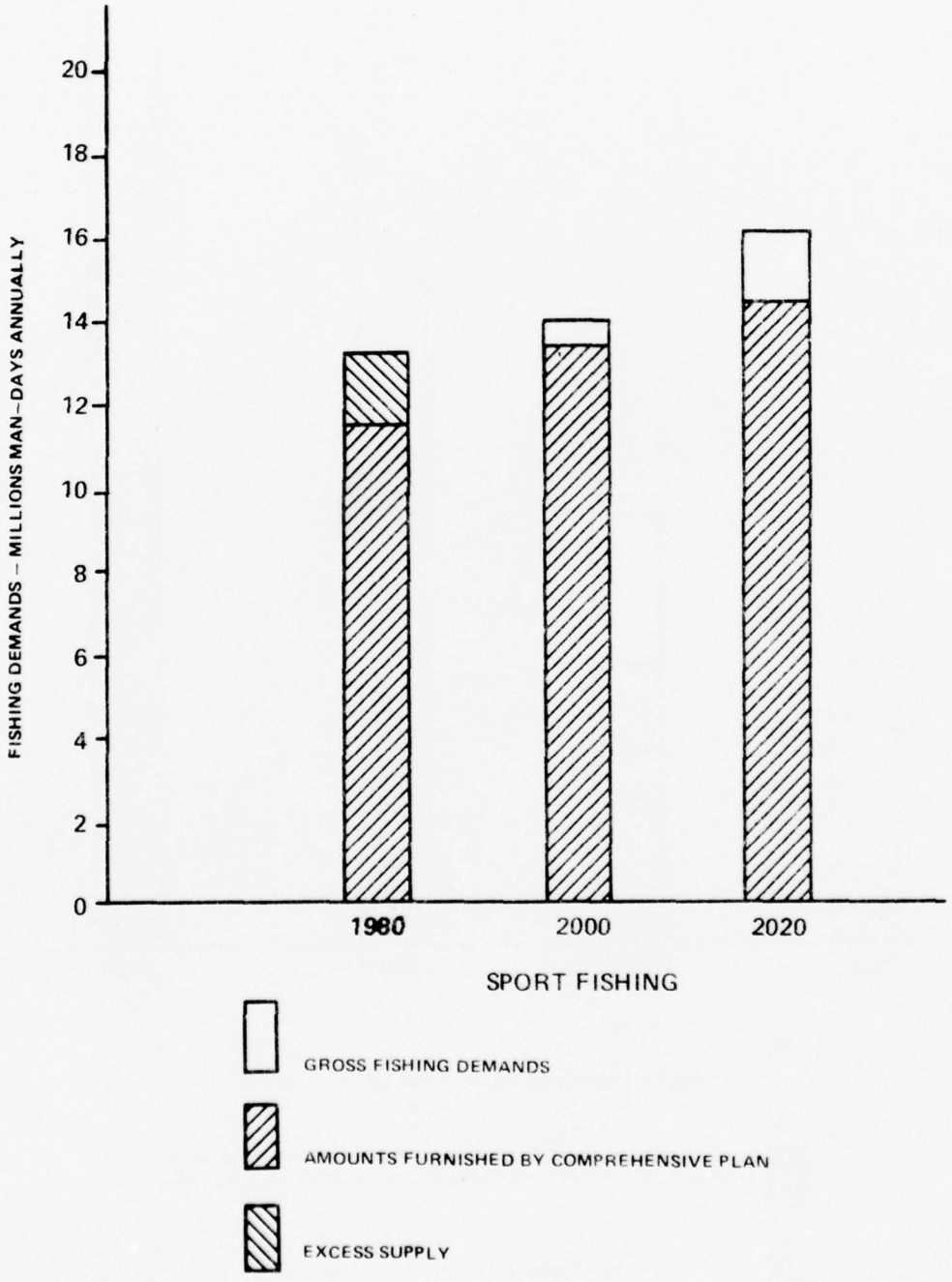





FIGURE C-6

## PROJECTED GROSS HUNTING DEMANDS AND AMOUNTS FURNISHED BY COMPREHENSIVE PLAN

### WABASH BASIN

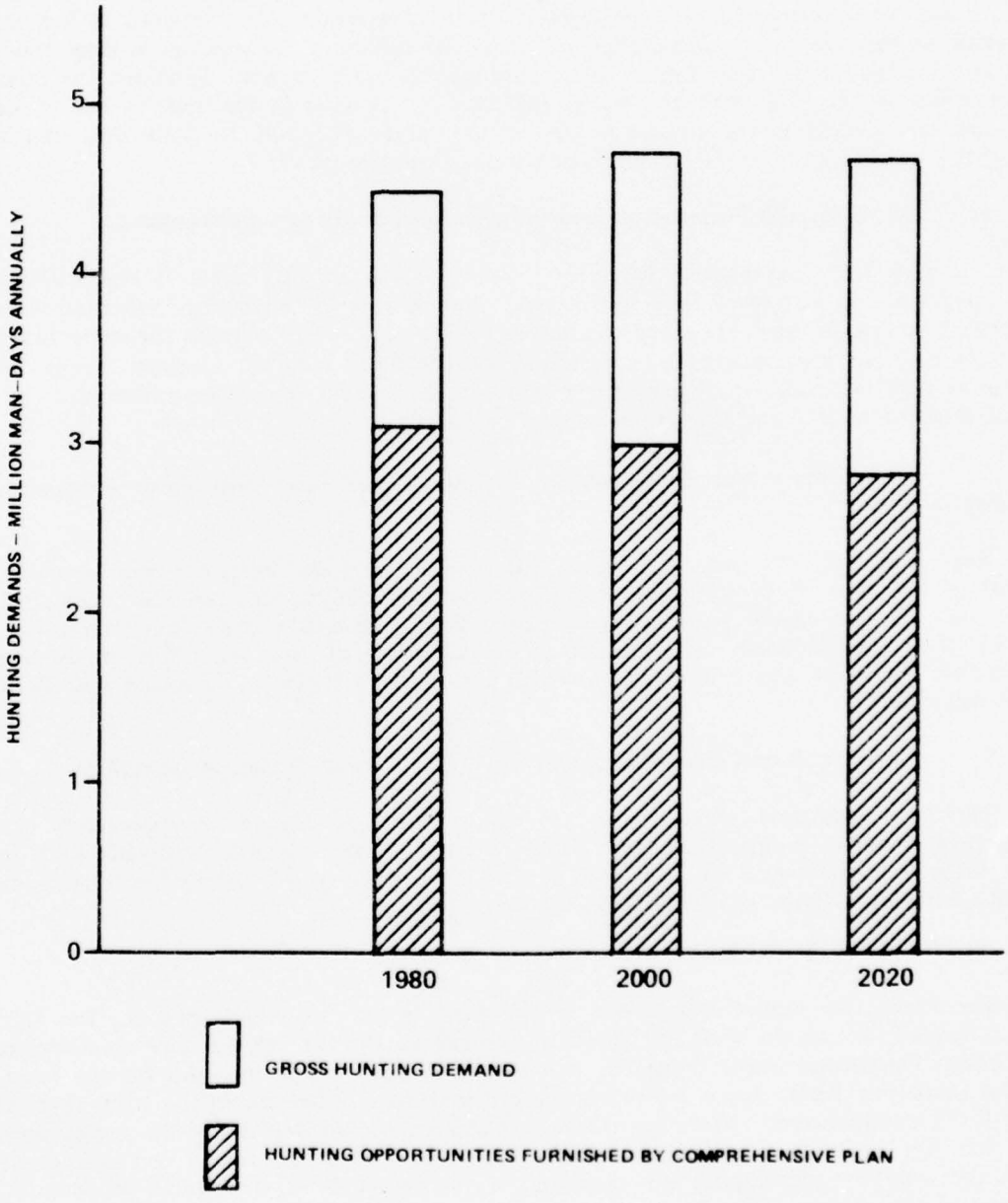





FIGURE C-7

### h. Irrigation

The irrigation demands of the basin are somewhat small. We find that the plan as presented has the capability of completely meeting the projected irrigation needs of the basin.

### i. Water for Cooling

There will be sufficient makeup water for cooling of thermal power stations in the Wabash Basin for the amount of power that is projected to be produced within the Wabash Basin, provided that off-channel, recirculating type cooling facilities are provided at all new plants to be constructed and at some present plants. Discretion must be used in locating new plants so that the water at the chosen locations is sufficient for making up evaporation losses and its use would not detract from meeting the water quality standards for other purposes. We believe that with the water that will be flowing in the streams and if the plants are not located in the environmental corridor area, there will be little difficulty in meeting the water requirements for the production of electric power.

### j. Water for the Preservation and Enhancement of Stream Environment

We have had considerable difficulty in the analysis of this need. It was difficult determining how much stream flow was needed. However, with the elements planned there is sufficient storage so that regulated discharges to the stream will provide the opportunity for protection and preservation of the stream environment. With an adequate supply the problem is then relegated to distribution which can and should be further addressed at the detailed stage of project and plan development.

### k. Preservation and Enhancement of the Basin Food and Fiber Production Capability

This need will be met to a great extent by the land treatment and structural elements of the plan. Preservation of productive capacity requires that we leave fertile soil on the land. It also means that we must reduce flood damages to agricultural endeavors. Both of these requirements are inherent and vital parts of the plan. The production requirements for food and fiber needs can be met through drainage, irrigation and flood control measures.

### l. Preservation and Enhancement of the Basin's Forest Resource Capability

The land treatment element of the plan provides a substantial opportunity for reforestation or forest improvement and also conversion of some marginal cropland back to forests. With implementation of the land treatment element of the plan, forest resource capability within the basin will be significantly improved.

## 44. PLAN DEFICIENCIES

There are two major deficiencies in the plan as we have developed it. The first major deficiency has to do with our inability to meet all the projected recreation demands in the basin. The second major deficiency is the lack of water regulation plan for the basin. With the numerous lakes, major reservoirs, watershed projects that are in the plan, there is a need for a comprehensive water regulation or water management plan for the basin. Such a plan has not been developed at this time, since this detailed regulation was considered beyond the scope of developing the plan and is recognized as a deficiency or potential deficiency of the plan.

## SECTION X – DISPOSITION OF PLAN DEFICIENCIES

It was previously indicated that there are two basic deficiencies in the plan as developed. The next question is, what can be done about these deficiencies.

### 45. REGULATION

The first deficiency has to do with the comprehensive regulation plan for water management in the entire basin. We conclude that the only way to correct this deficiency in the plan is to seek authorization for a comprehensive regulation plan which has to be coordinated among the members of the coordinating committee to assure that the regulation of waters in the basin are meeting all objectives efficiently. This comprehensive regulation plan would need to take into account all objectives: flood control, water supply, water quality, fish and wildlife, recreation, environment and regional objectives and incorporate therein all of the structures that are included in the early action plan as well as the long range plan. Many of the watersheds include uncontrolled floodwater retarding structures. The regulated structures within the watershed need to have a built-in compatibility with these unregulated structures.

### 46. RECREATION

The second deficiency that we have noted is our inability in the plan as presented to meet the recreation demands for the basin. There are the environmental corridors which will contribute to some degree to increased opportunities for recreation. However, in view of the parameters that were imputed into the recreation demands, these environmental corridors will not nearly meet the projected unsatisfied recreation demands. The subcommittee concludes that there are 3 primary ways of meeting this deficiency.

First, there needs to be a change in the use patterns of recreation facilities. We find that the recreation facilities are taxed to their limit during the summer weekends while they are not nearly used to their capabilities during the week. If the work characteristics of the populace could be changed, to, in essence a two weekend week, then the same recreation facilities, with no increase in capital, would increase the recreation supply by approximately 30 to 40 percent, thereby, greatly reducing the gap between supply and demand. In addition, we find that some projects which have been previously developed have the capability of expanding their recreation use. We conclude that these projects should be reexamined as early as practicable to determine if in fact that additional recreation facilities and recreational lands are warranted and desirable and could be acquired in conformance with existing laws and legislation. For example, we believe that the Cagles Mill Lake and Mansfield Lake which have been in operation for some time have the ability with a nominal amount of additional expenditure to assimilate some portion of the excess recreation demands and thus increase the supply from these specific projects. We believe that authorization should be sought to increase this recreation capability for all completed projects if in fact non-federal interests have met the requirements under existing legislation. In other words, if the requirements of Public Law 566 or Public Law 89-72 have been met, then these projects would be eligible for incorporation for additional recreational facilities. Thirdly, time zoning of the use of waters could provide for substantially greater use than presently or potentially exists without time zoning.

The subcommittee concludes that if the three ways of meeting recreation deficiencies are implemented, all or substantially all of the excess needs can be met by the plan.

## SECTION XI – PRIORITY FOR IMPLEMENTING PLAN

### 47. CRITERIA FOR ESTABLISHING PRIORITIES

There are certain criteria which have been used in establishing priorities for implementing each of the four elements of the plan. These priorities are discussed below for each element of the plan.

### 48. FLOOD PLAIN MANAGEMENT ELEMENT

The objectives of the Flood Plain Management element is to reduce flood damages by zoning or control of future developments in that portion of the flood plain which is subject to flooding. The criteria that will be used for establishing priorities is to determine which areas are most likely to be developed and to set up a flood plain management plan for those areas. Generally, these areas are contiguous to urban communities. Therefore, a judgement decision has been made regarding the areas most likely to be developed and a flood plain management plan would need to be prepared for these areas which are likely to be developed. Table C-48 indicates a priority for the flood plain management program as a part of the flood plain management element.

### 49. ENVIRONMENTAL CORRIDORS

There are two basic priorities for the environmental corridors. One would be those areas which have the highest absolute value and another would be those areas where if something isn't done in the immediate future the resource is likely to be lost for future generations. Table C-60 indicates the priorities accorded the environmental corridor element in the early action plan.

### 50. LAND TREATMENT ELEMENT

The land treatment element is also accorded two priorities. One priority would be for those areas which if not adequately treated would adveresly affect other programs. For instance, on those lands above impoundments, if erosion is not reduced it would adversely impact the economic and functional life of the impoundments. Into another category of this priority would be placed those lands which are deteriorating today at such a rate that if early action is not effected these lands would be lost as a viable resource. All other lands would fall into a second general priority category.

### 51. STRUCTURAL ELEMENTS

The general priorities for structural elements are indicated somewhat by their placement in either the long range or early action plan. However, we have further designated certain elements in the early action plan that need to be implemented before other elements. In establishing the priorities for the early action plan we have accorded a priority consideration to those elements within the early action plan that will contribute to the water supply needs and to the improvement of the quality of flows in the stream. These two criteria were the principal ones used to establish the priorities for implementing the early action plan. Table C–61 indicates the priorities accorded the structural elements in the early action plan.

## TABLE C–60. PRIORITY OF ENVIRONMENTAL STREAM CORRIDORS

**PRIORITY 1**

(1) Wabash River
(2) Tippecanoe River
(3) Wildcat Creek (including Middle Fork and South Fork)
(4) Eel River (Cass Co. to Whitley Co.)
(5) Mississinewa River
(6) Big Lick Creek
(7) Salamonie River
(8) Loblolly Creek
(9) Sugar Creek (Park Co. to Clinton Co.)
(10) Sugar Mill Creek
(11) Vermilion River
(12) Big Raccoon Creek (including Little Raccoon and Leatherwood Creeks)
(13) Busseron Creek
(14) Salt Fork
(15) Embarras River
(16) Little Wabash River (including Fox River)
(17) Eel River (Putnam Co. to Hendricks Co.)
(18) White Lick Creek (including East Fork)
(19) Eagle Creek
(20) West Fork White River
(21) Fall Creek
(22) Patoka River
(23) Muscatatuck River
(24) Lost River

**PRIORITY 2**

(1) Big Wea Creek
(2) Deer Creek (Carroll Co.)
(3) Little Vermilion River
(4) Bonpas Creek
(5) Deer Creek (Putnam Co.)
(6) Sugar Creek (Johnson Co. to Hancock Co.)
(7) Big Blue River
(8) Brandywine Creek
(9) Indian Creek
(10) Driftwood River
(11) Flatrock River
(12) East Fork White River
(13) Vernon Fork Muscatatuck River
(14) Big Graham Creek
(15) Little Salt Creek
(16) Black Creek

## TABLE C– 61. PRIORITY LISTING EARLY ACTION STRUCTURAL PLAN

Recommended Priorities for Major Reservoirs

1. Fall Creek
2. Crawfordsville
3. Parker
4. Salt Fork
5. Azalia
6. Deputy

Recommended Priorities for Local Protection Projects

1. Columbus, Indiana – West Levee, Wiemeyer Levee, Beatty Levee and Levee Unit No. 5
2. Patoka River – Channel improvement lower 35 miles. Levee Units 2, 3, 4, and 5.
3. Little Wabash River – Levee Units 7 and 8.
4. Lower Wabash River – Levee Unit 50

Watershed Projects

## SECTION XII – LEGISLATIVE AND INSTITUTIONAL CONSTRAINT MODIFICATION NECESSARY TO IMPLEMENT THE PLAN

### 52. GENERAL

In implementing the plan which has been developed and presented in preceding paragraphs, it has become evident that there are a number of institutional and legislative constraints that need to be removed in order to equitably and efficiently implement the plan. These constraints if unrectified or uncorrected would pose real impediments to developing a comprehensive and viable water resource plan for this basin or any basin. A brief summary and proposals thereon follows:

### 53. WATER QUALITY CONTROL

Public Law 566 under which a number of the structural components of the plan would be constructed does not provide for any federal participation for storage for water quality control. It would appear only equitable and fair that the critera for including water quality control in small projects would be the same as if a large project were built and that federal interests would be the same in both cases. In other words, where the beneficiaries are wide spread and augmentation of low stream flow is not provided in lieu of adequate treatment at the source that there should be a uniform federal responsibility in financing the cost for storage for water quality control.

### 54. ENVIRONMENTAL CORRIDORS

There is existing legislation which provides general authority for undertaking the development of an environmental corridor system as recommended in the plan. The Wild and Scenic Rivers Act has not considered any streams in the Wabash Basin. Irrespective of that we believe and conclude that although none of the environmental corridors, in isolation, have national significance, the system as included in the plan has a significant national objective. Accordingly, we believe that the funding for the environmental corridors should be cost shared between the federal government and non-federal interests in a 50-50 basis. In other words following the intent of Public Law 89-72, the Federal Water Project Recreation Act and Public Law 566, would enable the federal government to cost share with non-federal interests on an equal basis. We could not determine that there was any equitable difference between the traditionally accepted specific water using recreation activity and the more pastoral type recreation activity which would be provided by an environmental corridor system. Accordingly, it is felt that equity could best be served if there was a 50-50 cost sharing on the environmental corridors.

### 55. WATER SUPPLY

The postage stamp theory for water supply supports the theory of everyone paying the same price for the water they use. Some discussion has been accorded to the postage stamp theory for water supply. However, at this time the subcommittee is not prepared to make a specific recommendation thereon. However, we believe that this is a matter that needs to be addressed by the Coordinating Committee. For example, we could not agree that equity was being served wherein the cost brought about by the locational condition of one community would require it to pay considerably more than another community for raw water supply.

## 56. RECREATION

In trying to develop a basin plan for water resource development, we find that Public Law 89-72, the Federal Water Projects Recreation Act puts a considerable crimp into developing efficient plans. We believe that this crimp obtains by the language in 89-72 which pertains to the level of recreation benefits that are inherent in any particular project. P. L. 89-72 concludes that not more than 50 percent of the cost can be allocated to recreation in any project. In developing basin plans we are concerned with overall efficiency, the overall basin objectives, rather than the specific efficiency of a project and the specific objectives of a project. In many cases we find that the best balanced basin plan is made up of unbalanced projects. Accordingly, although the basin plan should meet the requirements of Public Law 89-72, it may be that specific projects would not meet that requirement. We believe that Public Law 89-72 should be revised to reflect that when a project is part of a comprehensive basin plan that it would not have to meet the 50 percent rule if in fact that project was unbalanced in order to provide the most efficient plan. Public Law 89-72 should also be revised to provide for continuing developments at authorized or completed projects wherein non-federal interests have or will have meet their obligations under Public Law 89-72.

## 57. GROUND WATER

We conclude that there must be or needs to be greater identification by virtue of research and study on the quantity and quality of ground water. In all of our deliberations we find that the greatest unknown regarding the specific quantity and quality of the resource lay in the area of ground water.

## 58. FLOOD PLAIN REGULATION

The States and subdivisions thereof should be encouraged to develop sound flood plain use plans designated to prevent unwise developments in the flood plain. To this end, no monies should be expended by Federal interests for flood control or flood insurance projects after 1976; unless, adequate and acceptable flood plain planning has been certified to be in effect by the states or subdivisions thereof for areas receiving project benefits.

## 59. SITE PRESERVATION

That compatible Federal and state legislative authority be obtained to acquire protect and preserve the water storage sites where such sites are required for the long term welfare of the populace and that interim uses be made of these sites for recreation fish and game management, agricultural production and forest management in accord with land use plans to be prepared by Federal and non-federal interests.

## 60. WATER SUPPLY STORAGE

That Title III of Public Law 85-500 (and comparable portion of Public Law 566) be modified to enable the Federal Government to underwrite the cost of providing added storage in projects for municipal and industrial water supply purposes. Provided there is a reasonable expectation that such storage will be required during the functional life of the project; and provided further, that non-federal interests indicate their intent to utilize this water at the time of need with payment and interest to begin at the time of use.

## 61. LAND TREATMENT

It is recommended that legislation be enacted that will place special emphasis upon early implementation of conservation land treatment and management practices above all major reservoirs in the basin as outlined in the comprehensive plan and similar to that carried out in small watershed projects.

## 62. INTERRELATED WATERSHED PROJECTS

Provide special authorization for the approximately thirty small watersheds which are closely interrelated with other developments in the early action plan (table H–86 of the Appendix H – Agriculture). Because of these interrelationships, concurrent or timely planning and installation of the related projects is essential to provide the most effective and efficient combination of measures.

## SECTION XIII – PUBLIC RESPONSE TO PLAN

### 63. GENERAL

Special efforts have been effected throughout the late study period, particularly since final plan formulation was initiated, to involve the public in the planning process. This effort has been multiple–pronged ranging from small informal meetings with local groups on local problems to public forums with several hundred present. In those instances where there was little or no local controversy regarding the plan we generally found an uninterested public. Conversely, where there was something in the plan which was locally controversial we found an interested and informed public. There were two main avenues by which the Coordinating Committee sought a public response; namely, open Coordinating Committee meetings and Public Forums.

### 64. COORDINATING COMMITTEE MEETINGS

There have been twenty-seven Coordinating Committee meetings of which the last ten or eleven have been devoted primarily to plan formulation. As a tentative plan was formulated for each subbasin the Plan Formulation Subcommittee reported thereon to the Coordinating Committee. These meetings were attended by interested citizens and representatives of organizations having an interest in the specific subject area being covered since the meetings were held in the area for which a plan was being considered. At each meeting the attending public was invited to comment on the information and proposals made by the subcommittee so that the Coordinating Committee would have the benefit of the public views before finalizing their plan. In many instances, due to the comments and interests of the public the Coordinating Committee directed the Plan Formulation Subcommittee to reexamine its proposals in light of information presented by the public. Accordingly, the plan as presented has a considerable amount of public input resulting from the open Coordinating Committee meetings.

### 65. PUBLIC FORUMS

After the plan was essentially complete the Coordinating Committee held a series of five public forums to present the plan and secure the public reaction to it. These public forums were held at Carmi, Illinois; Columbus, Terre Haute, Wabash, and Indianapolis, Indiana, and were attended by approximately 1800 people. The response was almost unanimously favorable to the plan with the only objection coming from conservation organizations who objected primarily to planning for more people and not to specifics of the plan as presented.

## SECTION XIV – DISCUSSION OF PLAN

### 66. GENERAL

The plan as developed has four basic elements – 1) Flood Plain Management; 2) Environmental Corridors; 3) Land Treatment; and 4) Structural. A summary of these elements is presented.

### 67. FLOOD PLAIN MANAGEMENT ELEMENT

The element consists of principal guidance to local communities and a priority listing of 47 communities where flood plain information reports should be effected. In addition as noted in Section XII there is a broad flood plain zoning requirement before implementation of the flood control portion of the structural element.

### 68. ENVIRONMENTAL CORRIDOR ELEMENT

In the interest of protecting and preserving the best of the remaining stream environments the element consists of some 1,700 miles of rural corridors and urban corridors in 35 urban communities. The cost of acquiring the necessary real estate for these corridors would be equally divided between Federal and non-Federal interests or in accord with other existing legislation where the acquisition would further other programs.

### 69. LAND TREATMENT ELEMENT

This element consists of measures to reduce erosion, improve production capability, improve forest stands and to provide for meeting long term food and fiber production goals on 14.1 million acres of land (64 percent of the basin).

### 70. STRUCTURAL ELEMENTS

The structural element consists of:

**a.** Eighty-five watersheds for the Early Action Plan and 62 watersheds for the Long Range Plan. These watersheds are proposed to be implemented in accord with Public Law 566. A list of these watersheds is provided in Appendix H.

**b.** Six multiple purpose lakes for Early Action Plan and seven multiple purpose lakes for the Long Range Plan. These lakes are proposed to be implemented in accord with applicable Flood Control and related purpose legislation.

**c.** One hundred twelve Advanced Waste Treatment facilities for the Early Action Plan and 64 Advanced Waste Treatment facilities for the Long Range Plan. These facilities are proposed to be implemented in accord with the Water Pollution Control Act.

**d.** Fourteen Local Protection Projects for Early Action Plan and two Local Protection Projects for the Long Range Plan. These projects are proposed to be implemented in accord with applicable Flood Control legislation.

**e.** Two Pilot Strip Mine Restoration Projects for the Early Action Plan.

**f.** One applied research type study for Early Action Plan for Grand Lake area, Ohio, designed to restore the viability of this water resource. This study is proposed to be prosecuted under existing authority in accord with Congressional Resolution.

## 71. DISCUSSION

The plan if and when implemented will provide for the current and future needs of the basin in an efficient and timely manner. There has been some concern that later population projections for the year 2020 have exceeded those used in formulation of this plan. We have been most concerned with the impact this added population load would have on the water supply requirements. We have made a gross analysis of the consequences of under-estimating population growth and have concluded that this increased population would not over utilize the available water. Some reallocation of storage and/or greater degrees of waste treatment may need to be effected, but the plan has sufficient resource flexibility to accommodate such measure. The greatest challenge in adapting the plan to accommodate more people than present projects would be eradicating the rigidity established by institutions and legislation. For example if institutions are unable to encourage people to locate where the water is then water must be brought to where the people are. This could well require diversion of water from one area to another. We would need to approach this problem with the premise that water is a common and public property that runs somewhat counter to the riparian doctrine. Table C–62 depicts the means by which greater water supply demands could be met by the plan.

The various Task Groups made a number of recommendations pertaining to their specific areas of interest. The Plan Formulation Subcommittee reviewed each recommendation and made disposition thereof within the purview of the total study and plan objectives. The objective of this action was to integrate parochial or limited objective recommendations into a comprehensive plan with a comprehensive set of recommendations. A summary of the recommendations from the several Task Groups along with the disposition thereof follows in tables C–63 through C–65. After this action a number of the Task Groups elected to modify their recommendations; some did not so elect and these were either rejected or incorporated into the Subcommittee recommendations to the Coordinating Committee. The Plan Formulation Subcommittee was not passing judgement on the merits of the recommendations but was passing judgement on the applicability of the recommendations as they pertained to the Comprehensive Study. A basis of judgement was that each recommendation needed to be covered and documented in the Appendix. Without such documentation there was little or no basis for the Plan Formulation Subcommittee or the Coordinating Committee to reach sound conclusions.

In establishing projects and programs, the Plan Formulation Subcommittee has provided units consisting of plan elements which are interrelated. The Plan Formulation Subcommittee concludes that optimum development of the Basin's water and related land resources can best proceed by units rather than by elements. For example a unit may consist of the elements as depicted on figure C–8. In which case joint authorization and concurrent implementation is extremely desirable. We recognize the legislative and institutional constraints against such unit development but conclude that institutions should deligently strive to eliminate those legislative constraints which trend to preclude optimum development. In recognition of the desirability of the unit approach a listing rationale and summary of units and priorities thereof follows for each subbasin and for the basin in general.

### a. Basin Implementation Priorities - General

The four basic elements of the early action plan (land treatment, environmental corridors, flood plain management and structural) as they apply in each of the basin's eight subbasins, have been categorized in three priority five-year time frame periods. The three five-year time periods cover the fifteen-year 1970 to 1985 early action plan implementation

## TABLE C–62. PROJECTED MUNICIPAL–INDUSTRIAL WATER REQUIREMENTS ASSUMING 25% EXCEEDENCE OF OBERS POPULATION PROJECTIONS

| Hydrologic subbasin | Projected demands for plan | | | Net increase in demand with 25% exceedence of projected population 1/ | | | Additional net reservoir capacity required at specific sites | | | Availability of additional storage |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1980 | 2020 | 1970 | 1980 | 2020 | 1970 | 1980 | 2020 | |
| | (mgd) | (mgd) | (mgd) | (mgd) | (mgd) | (mgd) | (ac-ft) | (ac-ft) | (ac-ft) | |
| Patoka | 5 | 8 | 20 | 1 | 2 | 5 | 1,400 | 2,000 | 7,600 | Can be met by storage in Patoka Reservoir. |
| East Fork | 57 | 81 | 220 | 14 | 20 | 55 | 5,400 | 8,100 | 27,000 | Could be met by either Deputy or Azalia Reservoirs |
| West Fork | 210 | 259 | 575 | 52 | 65 | 144 | 25,000 | 35,000 | 110,000 | Could be met by reallocation of storages in Fall Creek, Big Walnut, Parker and Big Blue Reservoirs and diversions from other impoundments. |
| Upper Wabash | 110 | 147 | 381 | 28 | 37 | 95 | 12,000 | 17,000 | 58,000 | Possible reallocation of Denver Reservoir storage. 2/ |
| Middle Wabash | 100 | 133 | 384 | 25 | 33 | 96 | 13,000 | 20,000 | 120,000 | Coal Creek Reservoir could supply through 1980-1990. 3/ |
| Embarras | 12 | 14 | 22 | 3 | 4 | 6 | 2,800 | 5,600 | 8,400 | Can be met by storage in Lincoln Reservoir 4/ |
| Little Wabash | 9 | 12 | 36 | 2 | 3 | 9 | 2,100 | 4,200 | 13,000 | Can be met by storage in Louisville and Helm Reservoirs 4/ |
| Lower Wabash | 3 | 4 | 11 | 1 | 1 | 3 | 1,000 | 1,600 | 5,000 | Can be met by a number of upstream reservoirs 4/ |
| TOTAL | 506 | 658 | 1,649 | 126 | 164 | 412 | 62,000 | 94,000 | 346,000 | |
| Project Population | (x 1,000) | | | | | | | | | |
| Proj Pop - Wab Basin | 3,750 | 4,250 | 6,381 | | | | | | | |
| Proj Pop + 25% | 4,687 | 5,312 | 7,976 | | | | | | | |
| Proj per capita Cons | 135 | 155 | 258 | | | | | | | |

1/ Assumes same per capita consumption noted above.
2/ No additional storage available in recommended projects; future services would be from reallocated storage, ground water or other single purpose site.
3/ Only Coal Creek Reservoir has reserve capacity available (30,000 acre feet).
4/ Storage available in reservoir sites as noted, from ground water or other impoundments.

## TABLE C–63. DISPOSITION OF RECOMMENDATIONS – APPENDIX D

| Recommendation number | Recommendation subject | Disposition by Plan Formulation Subcommittee (PFS) |
|---|---|---|
| 1 | Structural portion of flood damage reduction plan | Concur |
| 2 | Support of flood plain management program | Concur - with elimination of word "mandatory" |
| 3 | Early implementation of environmental stream corridor program | Concur |
| 4 | Special legislation for watershed elements of Early Action Plan | Concur - with addition of "Federal and State" between the words special and legislation |
| 5 | Special treatment for stream channel modification | Concur - with deletion of "and drainage purposes" and addition of "or not physically possible" at end of first sentence |
| 6 | Emphasis on early land treatment above damsites | Concur |
| 7 | Development of a flood control project regulation model | Concur - with elimination of last sentence regarding cost of study |

## TABLE C– 64. DISPOSITION OF RECOMMENDATIONS – APPENDIX I

| Recommendation Number | Recommendation Subject | Disposition by Plan Formulation Subcommittee (PFS) |
|---|---|---|
| 1 | Priorities be given to parts of the plan which have significant environmental impact. Also structural parts should be studied in detail. | The PFS concurs in general, however, there may be conflicts among project purposes and therefore a broader perspective is needed. The PFS has taken into consideration the priorities in developing the Plan. |
| 2 | State legislation and implementation of a comprehensive land and water use plan, including environmental aspects. | The PFS concurs, however, the comprehensive land use plan is not in the recommended plan but the Coordinating Committee should encourage the states to effect such a plan. |
| 3 | Acquisition of substantial areas of natural and environmental resources. | The PFS concurs and a significant length of environmental corridor is included in the plan. |
| 4 | Federal funds be withheld on projects until a state approved, land and water use plan is established which regulates downstream floodplain and assures conservation of environmental floodplain areas. | The PFS concludes that flood plain management is necessary and desirable but does not concur with the remainder of the recommendation as stated. |
| 5 | Monetary incentives to land owners for wildlife benefits. Example: Local tax reduction and more federal money. | The PFS concludes that local institutions should be encouraged to protect and benefit wildlife on private lands through incentative tax structure or other applicable means. |
| 6 | Public Law 566 be amended to provide more money for (1) public access to impoundments and (2) recreation development where needed or where a potential exists | The PFS concurs but concludes that suitable watersheds should be construed as pertaining to those watersheds which have State and local governmental sponsorship. |
| 7 | Encouragement of private sectors to develop recreation areas on private lands. | The PFS concurs. |
| 8 | State and local governments require sand and gravel quarry operations to prepare a plan of rehabilitation as a part of their quarry permit and after rehabilitation give governmental bodies first opportunity to purchase area for public recreation use. | The PFS concurs and concludes that all other extractors and users of the stream bank should be included. The subcommittee notes that this would be a part of recommendation 2 above. |
| 9 | The government acquire or lease presently abandoned strip mined land and develop it for recreational use. | The PFS generally agrees but only a part has been included in the plan. It is not conclusive that this land can be used for the purposes stated and this needs to be demonstrated. |
| 10 | The state water quality standards be met, for human body contact at multiple purpose impoundments and for streams which (1) are principal fishery streams (2) flow through environmental corridors or (3) have low flow augmentation. | The PFS concludes that the water quality should be consistent with the states water quality standards but only in consonance with the intended use of that body of water. |
| 11 | More Federal promotion of research and development projects, to test water re-use after advanced waste treatment. | The PFS concurs but believes that re-use should not be limited to or related to advanced waste treatments. |

## TABLE C–64. DISPOSITION OF RECOMMENDATIONS – APPENDIX I (CONTINUED)

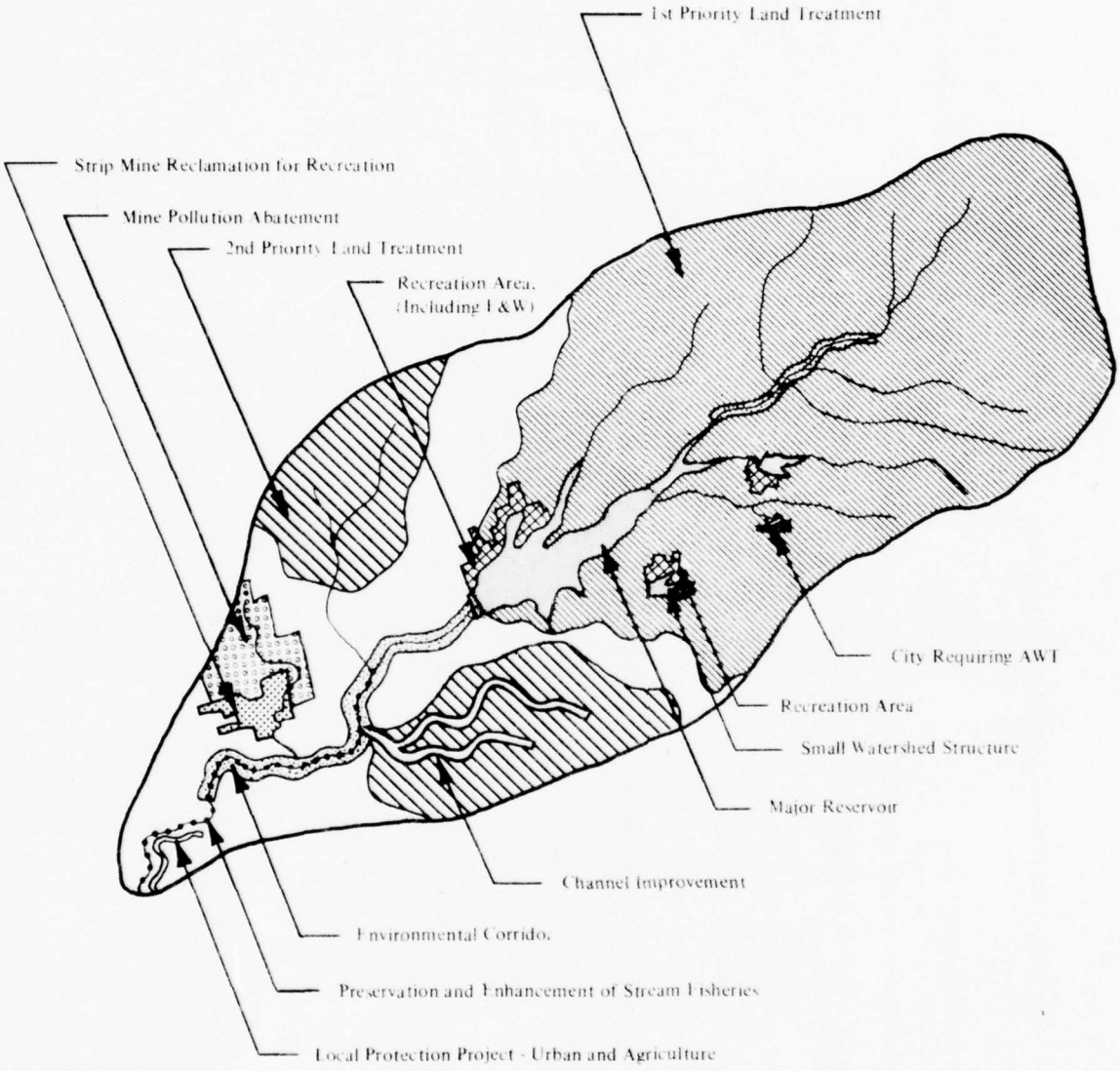
| Recommendation Number | Recommendation Subject | Disposition by Plan Formulation Subcommittee (PFS) |
|---|---|---|
| 12 | Expanding of archaeological research near impoundments and corridors. | The PFS concurs and believes that impoundments should have priority over environmental corridors. |
| 13 | Surplus military lands with potential for public recreation and fish and wildlife management be converted to those uses. | The PFS believes that all such land should be considered for public recreation and fish and wildlife uses but other uses may have higher priority and should be investigated before a final determination is made. |
| 14 | Additional stream corridor segments be studied, particularly along urban flood plains. | The PFS concurs. |
| 15 | Soil erosion and water runoff retention land treatment programs benefiting fish and wildlife be accelerated | The PFS concurs and notes that such an acceleration is included in the land treatment element of the plan. |
| 16 | Structural works proposals be subject to widely advertized public hearings by the sponsoring agency. | The PFS concurs, believes this to be presently in effect and also feels that non-structural elements should be included in the same proposal. |
| 17 | Emphasis on providing access and facilities for shore and boat fishing, especially near urban areas. | The PFS concurs and notes that the first part is included in the environmental element of the plan and the second part will continue to receive priority consideration. |
| 18 | Existing impoundments be investigated for potential increase in opportunities for fishing, hunting and recreation. | The PFS concurs and notes that such a recommendation is included in the plan. |
| 19 | Compensating for the loss of fishing and hunting habitat of projects be made in kind. | The PFS believes that the Fish and Wildlife Coordination Act of 1958 (PL 85-624) adequately covers this. |
| 20 | Development of projects to meet the unsatisfied fishing, hunting and recreation demands in subareas 2 and 6. | The PFS recognizes the unsatisfied demands in certain areas and they have been considered in establishing priorities for implementing the plan. |
| 21 | Study of the Shoals Reservoir site as a potential national recreation area. | The PFS believes that legislation exists for a study if and when local interests want it. It further concludes that the needs of subareas 2 and 6 should be given priority over this consideration in consonance with preceding recommendations. |
| 22 | The states and electric power companies coordinate power plant and transmissions line siting to minimize adverse environmental effects. | The PFS believes that these requirements presently exist. |
| 23 | Hunting Mourning Doves be legalized in the basin. | The PFS concludes that there is insufficient information available to make such a recommendation and such is presently within the purview of authority of existing institutions. |
| 24 | State and local construction agencies be required to prepare environmental impact statements. | The PFS concurs in the general intent of this recommendation and trust that report distribution will be such as to call attention of the state legislation to the needs relating to this matter. |

## TABLE C-64. DISPOSITION OF RECOMMENDATIONS - APPENDIX I (CONTINUED)

| Recommendation Number | Recommendation Subject | Disposition by Plan Formulation Subcommittee (PFS) |
|---|---|---|
| 25 | Federal cost sharing funds for natural area preservation | The PFS concurs in the general intent but such a study is beyond the water and water related land resources scope of the study. |
| 26 | Determination flow discharges from multiple-purpose impoundments to enhance fisheries be made through fishery biologists. | The PFS concurs and further concludes that the views of recreation specialists, ecologists, and sanitary engineers should be considered. The PFS notes cost sharing would be required in many instances under applicable Federal legislation. This is now being effected prior to construction. |
| 27 | Programs be developed to take advantage of the recreational fish and wildlife potential in highway construction. | The PFS concurs with the desirability of such but recognizes the practical difficulties in implementation and concludes that implementation should be on a selective basis, with sound management. |
| 28 | Acquisition rate of forest lands be increased. | The PFS concurs and accordingly additional amounts of forest lands are included in the plan. |
| 29 | States purchase additional hunting areas to maintain the 1968 ratio of State public hunting acreage to licensed hunters. | The PFS could recommend additional acres if it was shown that the 1968 ratio was right and that other recommendations did not satisfy the needed ratio. |
| 30 | Public lands be zoned against "off the road" vehicles. | The PFS concludes that some public land should be so zoned and that this is being accomplished in going programs. |
| 31 | Forest, recreation and wildlife management practices be coordinated and accelerated. | The PFS concurs and notes that such practices are presently in effect. |
| 32 | Federal and State natural resource agencies be funded and staffed to facilitate the inclusion of fish, wildlife and recreation elements into project plans. | The PFS concurs but notes that there is no evidence presented to indicate that such agencies are understaffed at the present time. |
| 33 | States develop state wide fish and wildlife plans and incorporate in the state comprehensive outdoor recreation plan. | The PFS concurs and believes that such a requirement should be partially funded through the Land and Water Conservation Act Fund. |

## TABLE C–65. DISPOSITION OF RECOMMENDATIONS – APPENDIX J

| Recommendation number | Recommendation subject | Disposition by Plan Formulation Subcommittee (PFS) |
|---|---|---|
| 1 | Continue gathering data on water use by the mineral industry | Concur |
| 2 | Study relationship of construction materials production to construction indexes in projecting local demand | Concur |
| 3 | Continue research on coal mine water pollution problems | Concur |
| 4 | Collect data, determine trends, and make projections of land use needs | Concur |
| 5 | Perform fundamental research on surface mined lands | Combine with recommendation #3. |
| 6 | Perform research in slope stabilization, erosion control and acid water formation | Concur |
| 7 | Locate and define abandoned underground mines near urban areas | Concur |
| 8 | Collect, prepare and publish data on land requirements for mineral production | Considered as a part of overall land use study. Expand to include reclamation procedures |
| 9 | Conduct studies of dissolved chemicals in mineral industries discharges | Concur |




**TYPICAL UNITIZED PROGRAM**



**FIGURE C–8**

period. As explained in the following paragraphs, interrelated elements have been grouped in the same priority period.

Implementation of environmental corridors along with stream fishery areas and access sites simultaneously with structural measures in all areas of the Wabash River basin is recommended. Twenty-four environmental corridor systems were recommended as first priority and sixteen were placed in second priority. These corridors would assist in satisfying recreation demands although substantial unmet demands will remain.

Land treatment implementation upstream from major reservoirs was recommended in the same priority time period as the specific major reservoir. Land treatment within the watershed project areas would be implemented when the watershed project was developed. No priorities were established for the long range program. It is assumed that non-structural programs initiated in the early action time frame would be continued.

Fifty-four communities in the Wabash River basin are recommended for Flood Plain Management Studies during the early action time frame. Priority within the early action period would be dependent on the size of the community and the projected growth potential. Sixty-one smaller communities having little growth potential were placed in the long range Flood Plain Management Studies program.

### b. Patoka River Subbasin Implementation Priorities

The principal problem in the Patoka Basin is the need for flood damage reduction and major drainage. The general approach in formulation of a flood control plan was to improve flood flow conditions in the lower Patoka so that peak flows could be discharged ahead of the Wabash River main stem peak flow, while at the same time, impounding optimum flood runoff in the upper Patoka Subbasin with releases scheduled to fill in behind the main stem peak flood flows for the Wabash River.

Accordingly with these regulation objectives, the authorized Patoka Reservoir with upstream land treatment measures, and Hall-Flat, Hunley-Ell, and Upper Patoka Tributary watersheds are recommended for planning as a unit of the early action plan. The channel modification, environmental corridor and local flood protection development in the lower Patoka are recommended for planning as another second unit. Implementation of the entire Patoka River Basin Plan is recommended as a first priority within the early action plan. It would be desirable to implement the entire early action plan for the Patoka River basin as a single program. However, separate implementation of the plan elements for the upper or lower basin should not be inconsistent with the overall orderly development of the Patoka River Basin Plan.

Advanced waste treatment for the Patoka River basin should be implemented as priority 1 in order to meet present and near future needs for stream water quality management. Action indicated by the State Implementation Plan calls for Advanced Waste Treatment for Jasper, Huntingburg and Princeton by 1977. About 70 percent of the area disturbed by surface mining in the Patoka Basin is in the South Fork Patoka River watershed. Implementation of mine pollution abatement was placed in the second five years or priority 2 since the study would have to be completed first.

The potential for ground water development in the Patoka Subbasin is small and the projected municipal and industrial water demands are increasing. Therefore water supply has been placed in the first priority to meet present and near future needs.

The long range plan should be implemented to meet those additional needs as they develop in the future.

### c. East Fork White River Implementation Priorities

The principal water resources problem in the East Fork White River Subbasin is the need for flood damage reduction. A major consideration in the formulation of such a plan was to provide control on as many tributaries as possible. This includes the Muscatatuck River on which extensive coordinated studies were undertaken, and seven different plans were considered.

The recommended plan includes the authorized Clifty Creek, Downeyville and Big Blue major reservoirs and the authorized Upper Big Blue River and Stucker Fork watershed projects. The Upper Big Blue watershed project, upstream of the Big Blue major reservoir, is recommended as a first priority construction element to be planned with but precede the Big Blue Reservoir which will follow as a second priority construction element. Clifty Creek Reservoir was placed in a first priority category due to its flood damage reduction contribution in the high flood damage reach from Columbus to the confluence of the Muscatatuck River. The Twin Rush Creek watershed was included in the first priority category in view of its under construction status and needs within the watershed area. Other watershed projects included in a first priority status because of urgency of needs within the watersheds are Dewitt Creek, West Boggs Creek, Delaney Creek, Upper Vernon Fork, Lower Vernon Fork, Lost River, White Creek - Beatty Walker Ditch and Denios Creek. Downeyville Reservoir is recommended as a second priority construction element along with upstream Upper Big Flatrock Creek watershed and the downstream Lewis Creek watershed. Aikman Creek watershed located near the mouth of the East Fork White River has been placed in a second priority category based on needs within the watershed project area relative to priority needs in other watershed project areas.

Deputy Reservoir on Big Creek, Azalia Reservoir on Sand Creek and Pond Creek, Little Salt Creek, Little Blue River and Brandywine Creek watershed projects are included as generally independent projects in the third priority category based on relative urgency of the needs satisfied by the various projects. In all instances, land treatment measures should be installed above major reservoirs during or before the appropriate priority period.

Among the numerous factors which require timely and coordinated planning and implementation of proposed developments in this subbasin are: (1) the high average annual damages, which amount to more than 20% of the 1968 damages for the total Wabash Basin; (2) the large number of planned impoundments, 18 small watershed projects and 5 major reservoirs; (3) the physical location of the planned major reservoirs and watershed projects as each will affect downstream flood and low flows on the East Fork. This latter situation emphasizes the need for development of a flow regulation model for the East Fork as an integral part of that proposed for the entire Wabash River basin.

First priority recommendations include Advanced Waste Treatment for seventeen communities in the East Fork Subbasin based on their need to provide such treatment or an acceptable alternative prior to 1980. Fourteen other communities would need to provide AWT to meet the long range needs developing in the future.

Water supply for the East Fork Subbasin is recommended as first priority to provide an additional 18 mgd total needed supply by 1980. The long range water supply plan would provide for additional needs of about 136 mgd by 2020.

### d. West Fork White River Subbasin Implementation Priorities

The principal problems in the West Fork Subbasin include flood damages, water supply and stream water quality problems. The upper half of the subbasin is highly

urbanized and water resources problems are related to this urban situation. The West Fork Subbasin is also within the area of the highest unsatisfied recreational demands. Approximately one-third of the flood damage problems are urban and concentrated in urban areas of Muncie, Anderson, Noblesville and Indianapolis. The Indianapolis area has the most pressing water supply and water quality problems in the basin. Accordingly, major reservoirs which serve the Indianapolis area, i.e., the authorized Big Walnut Reservoir, or its alternative, and the recommended Parker and Fall Creek Reservoirs are included as first priority projects in the early action plan, in addition to land treatment measures recommended for these reservoir drainage basins. The Whitelick Creek watershed project also has an influence on the Indianapolis area and is included as a first priority project in the early action plan. Other first priority upstream watershed projects include the authorized Indian Creek, Prides Creek, Mill Creek, the partially completed Lattas Creek in addition to the recommended Little Walnut Creek, Killbuck Creek, Black Creek, Veale Creek, Croys Creek and Wilson Creek. Of these projects Mill Creek and Little Walnut Creek were placed in first priority, due to their relationship to the completed Cagles Mill Reservoir and the authorized Big Walnut Creek Reservoir, respectively. Indian Creek, Prides Creek, Killbuck, Black Creek, Veale Creek and Croys Creek watershed projects were all placed in a first priority position due to the urgency of needs within these watershed project areas.

Second and third priority recommendations for the remaining watershed projects were based on the relative urgency of meeting water resources development needs within the respective watersheds. Second priority recommendations include the following watershed projects: Birch Creek, Splunge Creek, Jordan Creek and Rattlesnake Creek.

The remaining early action watershed projects comprise the third priority recommendations. These consist of Deer Creek, Bryant Creek and Lagoon Ditch.

Serious organic pollution exists in most of the West Fork White River from Muncie to Spencer. This reach also furnishes part of the water supply for Muncie, Anderson and Indianapolis. Twenty-eight communities in the West Fork Subbasin need to provide advanced waste treatment or an acceptable alternative during the early action period. In order to meet these near future needs, installation of advanced waste treatment facilities was recommended as first priority for these communities.

Fourteen other communities in the subbasin are included in the long range recommendations for needs developing during the planning period 1980 to 2020.

Additional water supply sources to meet present and near future needs for the communities of Muncie, Elwood, Winchester, Indianapolis, Greencastle, Anderson and Plainfield is a first priority development need.

Approximately eighty other communities throughout the subbasin are identified for development of municipal and industrial water supply by 2020 as a part of the long range plan.

### *e. Upper Wabash River Subbasin Implementation Priorities*

Flooding and drainage have been major problems throughout the Upper Wabash River subbasin. Flood conditions on the Wabash River have been modified significantly by the operation of three major reservoirs: Huntington, Mississinewa and Salamonie Reservoirs. Priority categories were determined primarily on the basis of relative water resource needs within various watersheds.

First priority recommendations include the authorized Lafayette Reservoir, Marion Local Flood Protection, Rock Creek, Wells County watershed project in addition to the

partially completed Mill Creek, Fulton County in Bachelor Run watershed. Other first priority recommendations include the Buckeye Hoosier watershed on the Wabash River above Huntington Reservoir, Salamonie River watershed and above Salamonie Reservoir, Rock Creek, Cass County, watershed and Goose Creek watershed at Logansport. The second priority recommendations include the following small watershed projects: Clear Creek, Little River, Pony Creek, House-Barte and Upper and Lower Mississinewa River watersheds. Third priority recommendations include six watershed projects as follows: Brown-Hill, Big Monon Ditch, Mud Creek, Sugar Creek, Burnetts Creek, and Crooked Creek. These six projects consist primarily of channel improvements due to the flatness of the topography in the absence of structure site location.

The flat to depressional topography which characterizes the upper reaches of this subbasin has reduced the possibility of developing the combination of upstream and downstream flood control measures. However, the effects of the watershed projects upstream from the three operating major reservoirs should be studied and the projects operated as a system for optimum flood control as is consistent with the authorized project purposes. Land treatment measures above the authorized Lafayette Reservoir should be implemented as soon as practicable in relation to its initial construction phase.

In order to meet the near future needs in the Upper Wabash Subbasin, installation of advanced waste treatment facilities was recommended as first priority for seventeen communities. Ten of these are required by the State of Indiana to adopt effective control measures before 1978.

Another 24 communities in the subbasin are included in the long range plan recommendations for needs developing during the planning period 1980 to 2020.

Of the 52 areas for which water supply demands were individually projected, 21 would need additional water supply by 1980. However, only Kokomo cannot meet its projected need from locally available ground sources. This is a first priority development need.

Ground water supplies the bulk of municipal and industrial use and is generally available over the area, usually in plentiful supply for all except the larger communities. These communities are recommended for long range municipal and industrial water supply development by 2020.

### f. Middle Wabash River Subbasin Implementation Priorities

Major problems include flood damage and drainage and water quality control. The major urban centers of Terre Haute, Vincennes, and Danville are included in the subbasin although urban damage constitutes less than ten percent of the total subbasin damages.

The recommended plan includes the authorized Big Pine Reservoir and the partially completed watershed projects on Busseron Creek, Kickapoo Creek - Vigo County and Little Raccoon Creek. In view of the need for additional surface water supply in the Crawfordsville - Montgomery County the development of the Crawfordsville Reservoir has been assigned a first priority. The Lye Creek watershed is planned as a compatible project with Crawfordsville Reservoir and included for unit development in a first priority category. The environmental corridors both upstream and downstream of Crawfordsville Reservoir are also recommended for development as a unit with Crawfordsville Reservoir in a first priority category. The following watershed projects are also recommended for inclusion in the plan on a first priority category based on the urgency of water resources development needs within the respective project areas: Mill Creek, Snyder Creek and Sugar Creek in

Illinois; and Snapp-Kelso, Mariah Creek, Otter Creek, Fall Creek, Feather Creek, Big Raccoon Creek and Jordan Creek in Indiana, with particular emphasis on land treatment measures for watersheds above the existing authorized and early action major reservoirs in the subbasin.

Second priority recommendations in the early action plan include Salt Fork Reservoir in Illinois and Turtle Creek, Honey Creek and Coal Creek watershed projects in Indiana.

The Coal Creek watershed would be planned to provide minimum conflict with the long range plan of development for Coal Creek Reservoir. Strong Creek watershed located upstream of Salt Fork Reservoir is included in the long range plan, however, it is recommended that local interests be encouraged to accelerate development of the watershed project commensurate with the major reservoir. Third priority recommendations based on relative development needs within these watersheds are: Vieke Ditch, City Ditch, Lower Shaker Prairie Ditch in Indiana and Raccoon Creek in Illinois. These projects would be developed separately and not as part of any unit. The environmental corridors on the Vermilion River, the main stem Wabash River and on Raccoon Creek downstream of Mansfield Reservoir are recommended for implementation with Salt Fork Reservoir in the second priority time frame.

Fifteen communities in the Middle Wabash Subbasin need to provide advanced waste treatment or an acceptable alternative during the early action period. In order to meet these near future needs, installation of advanced waste treatment facilities was recommended as first priority for these communities. Fifteen other communities in the subbasin are included in the long range recommendations for advanced waste treatment needs developing during the planning period 1980 to 2020.

Pool quality runoff from surface mined areas was found in Vermilion County, Illinois, Vermillion County, Vigo County, and Sullivan County, Indiana. Implementation of mine pollution abatement was recommended in the second five year period or priority two, since the study would have to be completed before implementation.

Six communities in the Middle Wabash Subbasin indicate a need for additional water supply by 1980. Additional water supply was recommended as first priority to supply an additional 180 mgd to meet the near future needs of the subbasin.

Approximately twenty other communities would need additional water supply by 2020 and are recommended for development of municipal and industrial water supply of 330 mgd as a part of the long range plan.

### g. Embarras River Subbasin Implementation Priorities

The principal problems in the Embarras River subbasin are flood damage and drinage. Generally, the flat topography to the north (upstream) of Charleston, Illinois, has primarily drainage problems and the areas to the south has primarily flood problems. Coordinated studies centered on the analysis of alternative major reservoirs and upstream watershed projects on the North Fork Embarras, Muddy Creek, and Crooked Creek tributaries. The selected plan was that which provided for maximum net benefits, with a high degree of flood damage reduction on the Embarras River.

The first priority projects recommended for unit implementation consist of the authorized Lincoln Reservoir, Scattering Fork Watershed which is partially completed, and the projects on the North Fork Embarras, Juddy Creek (E–21), Brushy - Birch Creek. The second priority Brushy Creek would be added during the second five year period. This project, in

addition to the partially completed Scattering Fork project, will meet a significant portion of the drainage needs requiring project action in this portion of the Wabash Basin. The Embarras River environmental corridor system is recommended for first priority development.

Recommendations for the third priority segment of the plan consist of the Muddy Creek (E–5) watershed project and Crooked Creek. These projects would be developed downstream from the first priority projects.

The recommended plan for the Embarras Subbasin will provide significant flood damage reductions in the major tributary watersheds, and likewise on the Embarras River itself. Land treatment measures applied upstream of Lincoln Reservoir would be an important part of the total subbasin first priority program. Of major importance in planning will be the timing of controlled flood discharges to provide maximum flood damage reductions on major tributaries and the Embarras River. Analytical model studies should be undertaken to ensure than planned developments are constructed and operated so as to maximize the net overall flood damage reduction benefits.

In order to meet the near future need for water quality in the Embarras Subbasin installation of advanced waste treatment facilities was recommended as first priority for fourteen communities. The long range plan implementation was recommended to meet the additional water quality needs as they develop between 1980 and 2020.

Although ground and surface water both are utilized to meet municipal and industrial water needs of the Embarras Subbasin ground water is presently the chief source of water supply for most subbasin communities.

Arcola and Charleston, Illinois, indicate a need for additional water supply by 1980 and are recommended as first priority. Newton and Casey, Illinois, must also develop new water supply resources or move outside their local areas for development of available resources.

About seven additional communities indicate water supply needs by 2020 and are recommended for long range development to meet those additional needs.

### h. Little Wabash River Subbasin Implementation Priorities

Major problems in the Little Wabash River subbasin include flood damage, primarily agricultural, impared drainage and water supply problems in scattered small communities. Limited channel capacity on the Skillet Fork tributary accentuates the flooding and drainage outlet problems in the lower half of that tributary.

To facilitate main stem flood damage reduction, the recommended first priority portion of the early action plan includes the authorized Louisville Reservoir and the Seven Mile Creek watershed project. The Upper Little Wabash River and Salt Creek watersheds upstream of Louisville Reservoir should be planned and implemented in conjunction with the Louisville Reservoir.

The Big Muddy and Fox River watersheds, having first priority and located downstream of Louisville Reservoir would be developed as separate units. First priority development in the Skillet Fork would place Auxier-Big Creek and Pond Creek watersheds in operation followed by Helm Reservoir as second priority and Lick Creek, Big Mound, Dry Fork and Horse Creek as second priority watershed developments downstream of Helm Reservoir. These developments in the Skillet Fork are generally independent and can be

implemented separately. Land treatment measures in drainage areas above the major reservoirs should be installed before or concurrently with the reservoir development.

The urgency of meeting the needs in the subbasin for flood control, water supply and allied purposes have necessitated that all project proposals be met on a first or second priority basis. There are therefore no third priority project proposals. The environmental corridor system for the Little Wabash River is recommended as a first priority development.

Except for the upper Little Wabash and Salt Creek watershed projects, all other recommended early action watersheds are located downstream from Louisville and Helm Reservoirs. This places additional emphasis on the need for development of an analytical model to study the timing of controlled releases from watershed projects in conjunction with releases from the two major reservoirs. Levee Units 7 and 8 are located on opposite sides of the Little Wabash River and should be constructed simultaneously in addition to the authorized Levee Unit 2 further downstream.

Sixteen communities in the Little Wabash River subbasin have been identified as needing improvements in their sewer systems. Fifteen of these need to provide advanced waste treatment or an acceptable alternative prior to 1980. The construction of treatment systems for these communities is recommended as first priority in order to meet present and near future needs.

Seven communities indicating additional needs for water supply before 1980 are recommended as first priority to meet present and near future needs. In addition to these, four other communities are included in the long range development plan to provide 36.3 mgd for municipal and industrial water supply in 2020.

### i. Lower Wabash River Subbasin Implementation Priorities

Since this subbasin is comprised of the furtherest downstream reaches of the mainstem Wabash River plus the several smaller tributaries which outlet into these reaches, it is apparent that it will be affected more by developments in the other seven subbasins than by any projects which can be recommended internally. This subbasin is also subject to backwater effects from the Ohio River.

There are no authorized major reservoirs or watershed projects in the subbasin. First priority recommendations include levee units, along with Bonpas Creek, Illinois and Gresham Creek, Indiana watershed projects. The environmental corridor on Bonpas Creek is included as a first priority development to be implemented with the Bonpas Creek watershed. The environmental corridor along Black River is recommended for acquisition as a first priority element. The second priority recommendation includes authorized Levee Units No. 1 and 2 and the Big Creek watershed project in Indiana. Third priority recommendations include authorized Levee Units No. 3 and 4 and Levee Unit No. 50, plus the watershed project on McHenry-Hawthorne in Illinois, and Scott Ditch-Coffee Bayou in Indiana.

## SECTION XV – CONCLUSIONS

The Plan Formulation Subcommittee concludes that the plan as presented is the best that can be developed at this time. We recognize the limitation of planning for the future but at the same time realize that the quality of living in the future is dependent to a great extent on the quality of today's planning for the future. If there is one overriding conclusion that we have reached it is that "Regional water management is mandatory if man is to continue to enjoy a full life, for without regional water management excess resources are used." We further conclude that there must be a continued eradication of bureaucratic and institutional bias in resource planning and management lest we are merely exploiting the resource base rather than planning for the wise use and reuse of the resource base. This study and the communications established therein have contributed significantly to eradication of the bureaucratic bias. This trend needs to be continued and furthered. The Plan elements and features are shown by subbasin in tables C–66 through C–73. The overall basin plan is summarized in table C–74. These tables also include a listing of priorities. These priorities are in accord with the principles established in Section XI except that an additional priority has been established for a number of watersheds in accord with instructions from the Coordinating Committee whereby specified legislation will be secured to advance the watershed program faster than normal. The location of the project and plan elements are shown for each hydrologic subbasin on plates C–2 through C–10. The basin wide plan of development for major reservoirs, watershed projects and local protection projects is shown on plate C–1.

TABLE C–66. PATOKA SUBBASIN – PLAN FEATURES AND FINANCIAL DATA

| Project or program | Project no and priority [4] | Purpose [1] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE STRUCTURAL MEASURES** | | | | | | |
| **EXISTING, UNDER CONSTRUCTION AND AUTHORIZED** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Patoka Reservoir [2] | 11-1 | FC,WQ,WS,R | | | 29,324 | 29,324 |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Upstream Watershed Projects | | | | | | |
| Hunley-Ell [5] | 194-1 | FC,R,WQ,WS | 3,689 | 1,549 | 5,238 | |
| Upper Patoka [5] | 198-1 | FC,WQ,WS | 518 | 153 | 671 | |
| Hall-Flat Creek [5] | 199-1 | FC,R,WQ,WS | 2,111 | 825 | 2,936 | 8,845 |
| Local Protection Projects | | | | | | |
| Patoka Levee Unit 2 | 80-1 | FC | 470 | 25 | 495 | |
| Patoka Levee Unit 3 | 81-1 | FC | 500 | 57 | 557 | |
| Patoka Levee Unit 4 | 82-1 | FC | 377 | 44 | 421 | |
| Patoka Levee Unit 5 | 83-1 | FC | 225 | 21 | 246 | |
| Patoka Channel Improvement | 84-1 | FC | 4,000 | 500 | 4,500 | 6,219 |
| Advanced Waste Treatment | – 1 | WQ | --- | 730 | 730 | 730 |
| Mine Pollution Abatement | – 2 | WQ | 4,000 | --- | 4,000 | 4,000 |
| Water Supply | – 1 | WS | --- | 250 | 250 | 250 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Maltersville | 23-L/R | FC,R | 7,191 | 1,969 | 9,160 | 9,160 |
| Upstream Watershed Projects | | | | | | |
| Flat Creek | 260-L/R | FC,WS | 72 | 41 | 113 | |
| Cup Creek | 261-L/R | FC,R,WS | 328 | 251 | 579 | 692 |
| Advanced Waste Treatment | – L/R | WQ | --- | 2,000 | 2,000 | 2,000 |
| Water Supply | – L/R | WS | --- | 2,000 | 2,000 | 2,000 |

TABLE C–66. PATOKA SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority 4/ | Purpose 1/ | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE ENVIRONMENTAL REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES** | | | | | | |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Environmental Corridors | – 1 | E,R,FW | 1,560 | 1,560 | 3,120 | 3,120 |
| Stream Fishery | – 1 | E,R,FW | 205 | 205 | 410 | 410 |
| Access Sites | – 1 | E,R,FW | 67 | 67 | 134 | 134 |
| Flood Plain Management | – 1 | FC,E | 63 | --- | 63 | 63 |
| Use of Surface Mined Areas for Recreation | – 2 | E,R,FW | 257 | 257 | 514 | 514 |
| Land Treatment | – 1 | E,SC | 3,108 | 3,080 | 6,188 | 6,188 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Land Treatment | – L/R | E,SC | 1,411 | 1,398 | 2,809 | 2,809 |
| Flood Plain Management | – L/R | FC,E | 50 | --- | 50 | 50 |
| Use of Surface Mined Areas for Recreation | – L/R | E,R,FW | 730 | 730 | 1,460 | 1,460 |
| TOTALS 3/ | | | | | | |
| Federal First Cost | | | 30,932 | | | |
| Non-Federal First Cost | | | | 17,712 | | |
| Subbasin Grand Total | | | | | 48,644 | 48,644 |

1/ Purpose index, see table 66. (Main Report).

2/ Authorized. Land acquisition has been started.

3/ Subbasin plan does not include basinwide measures.

4/ Priorities within Early Action Plan time frame (10–15 years)
1 – 1st five year period.
2 – 2nd five year period.
3 – 3rd five year period.
L/R – Long Range Plan (No priorities designated within Long Range Plan).
N/A – Not applicable.

5/ Special authorization for these projects is highly desirable for the timely interagency planning and installation of interrelated projects.

TABLE C– 67. EAST FORK SUBBASIN – PLAN FEATURES AND FINANCIAL DATA

| Project or program | Project no and priority[4/] | Purpose[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE STRUCTURAL MEASURES** | | | | | | |
| **EXISTING, UNDER CONSTRUCTION AND AUTHORIZED** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Big Blue | 13-2 | FC,R | | | 34,982 | |
| Downeyville | 14-2 | FC,R,WS | | | 41,421 | |
| Clifty Creek | 10-1 | FC,R,WS,WQ | | | 21,268 | |
| Monroe (Existing) | 3-N/A | FC,R,WS,WQ | | | 14,836 | 112,507 |
| Upstream Watershed Projects | | | | | | |
| Elk Creek (Existing) | 91-N/A | FC,I,FW | | | 861 | |
| French Lick Creek (Existing) | 93-N/A | FC,FW | | | 1,084 | |
| Boggs Creek (Existing) | 92-N/A | FC | | | 689 | |
| Stucker Fork (Existing) | 104-N/A | FC | | | 3,900 | |
| Twin Rush Creek (Existing) | 106-1 | FC,WS,R | | | 1,184 | |
| Dewitt Creek | 105-1 | FC | | | 339 | |
| Upper Big Blue River | 107-1 | FC,WS,WQ,R | | | 10,928 | |
| West Boggs Creek | 108-1 | FC,R | | | 2,136 | 21,121 |
| Local Protection Projects | | | | | | |
| East Fork Levee Unit 2[2/] | 45-N/A | FC | | | | |
| East Fork Levee Unit 3[2/] | 43-N/A | FC | | | | |
| Shoals Local Protection[2/] | 49-N/A | FC | | | | |
| Orleans Local Protection | 77-3 | FC | | | 646 | 646 |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Deputy | 18-3 | FC,R,WQ | 27,294 | 2,306 | 29,600 | |
| Azalia | 17-3 | FC,R,WQ | 22,282 | 7,018 | 29,300 | 59,900 |
| Upstream Watershed Projects | | | | | | |
| Aikman Creek | 145-2 | FC,D | 592 | 178 | 770 | |
| Lost River | 146-1 | FC,R,WS | 5,257 | 2,455 | 7,712 | |
| Upper Vernon Fork [6/] | 147-1 | FC,R,WS,WQ | 4,050 | 4,322 | 8,372 | |
| Lower Vernon Fork[6/] | 148-1 | FC,R,D | 5,727 | 2,490 | 8,217 | |
| Pond Creek | 149-3 | FC,R,D | 792 | 603 | 1,395 | |
| Little Salt Creek | 150-3 | FC | 576 | 144 | 720 | |
| White Creek-Beatty Ditch [6/] | 151-1 | FC,R,D | 4,180 | 2,151 | 6,331 | |
| Denios Creek | 152-1 | FC,R | 675 | 530 | 1,205 | |
| Lewis Creek | 153-1 | FC,D | 886 | 370 | 1,256 | |

TABLE C–67. EAST FORK SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority[4/] | Purpose[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Upper Big Flat Rock River[6/] | 154-2 | FC,WS,FW,D | 2,128 | 1,697 | 3,825 | |
| Delaney Creek | 155-1 | FC,I,R | 997 | 484 | 1,481 | |
| Brandywine Creek | 156-3 | FC,D | 1,073 | 337 | 1,410 | |
| Little Blue River[6/] | 157-3 | FC | 1,041 | 260 | 1,301 | 43,996 |
| Local Protection Projects | | | | | | |
| Wiemeyer | 86-1 | FC | 165 | 30 | 195 | |
| Beatty | 87-1 | FC | 1,185 | 125 | 1,310 | |
| Levee Unit 5 | 88-N/A | FC | 1,250 | 123 | 1,373 | |
| Columbus West | 85-1 | FC | 1,190 | 185 | 1,375 | 4,823 |
| Levee Unit 17 | 89-2 | FC | 470 | 100 | 570 | 4,823 |
| Advanced Waste Treatment | – 1 | WQ | --- | 9,800 | 9,800 | 9,800 |
| Water Supply | – 1 | WS | --- | 3,500 | 3,500 | 3,500 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Upstream Watersheds | | | | | | |
| Sugar and Slate Creeks | 220-L/R | FC,R | 723 | 467 | 1,190 | |
| Sulphur Creek | 221-L/R | FC,R | 602 | 490 | 1,092 | |
| Guthrie Creek | 222-L/R | FC,R,WS | 1,407 | 949 | 2,356 | |
| Buffalo Creek | 223-L/R | FC,R | 663 | 534 | 1,197 | |
| McHargue Ditch | 224-L/R | FC,D | 113 | 39 | 152 | |
| John Thompson Ditch | 225-L/R | FC | 119 | 30 | 149 | |
| Big Slough | 226-L/R | FC | 177 | 44 | 221 | |
| Youngs Creek | 227-L/R | FC | 388 | 97 | 485 | |
| Bear Creek | 228-L/R | FC,R | 328 | 311 | 639 | |
| Advanced Waste Treatment | – L/R | WQ | | 12,000 | 12,000 | 12,000 |
| Water Supply | – L/R | WS | | 21,000 | 21,000 | 21,000 |
| **EARLY ACTION AND LONG RANGE ENVIRONMENTAL, REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES** | | | | | | |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Environmental Corridors | – 1 | E,R,FW | 6,120 | 6,120 | 12,240 | 12,240 |
| Stream Fishery | – 1 | E,R,FW | 1,746 | 1,746 | 3,492 | 3,492 |
| Access Sites | – 1 | E,R,FW | 360 | 360 | 720 | 720 |
| Flood Plain Management | – 1 | FC,E | 302 | --- | 302 | 302 |

TABLE C– 67. EAST FORK SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority 4/ | Purpose 1/ | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Use of Surface Mined Areas for Recreation | – 2 | E,R,FW | 775 | 775 | 1,550 | 1,550 |
| Land Treatment | – 1 | E,SC | 24,073 | 23,863 | 47,936 | 47,936 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Land Treatment | – L/R | E,SC | 10,507 | 10,415 | 20,922 | 20,922 |
| Flood Plain Management | – L/R | FC,E | 490 | --- | 490 | 490 |
| Use of Surface Mined Areas for Recreation | – L/R | E,R,FW | 2,200 | 2,200 | 4,400 | 4,400 |
| TOTALS 3/ | | | | | | |
| Federal First Costs | | | 132,903 | | | |
| Non-Federal First Costs | | | | 120,648 | | |
| Subbasin Grand Total | | | | | 387,825 5/ | 387,825 5/ |

1/ Purpose index, see table 66. (Main Report)
2/ Authorized.
3/ Subbasin plan does not include basinwide measures.
4/ Priorities within Early Action Plan time frame (10-15 years).
1 – 1st five year period.
2 – 2nd five year period.
3 – 3rd five year period.
L/R – Long Range Plan (No priorities designated within Long Range Plan).
N/A – Not applicable.
5/ Includes $22,500 for constructed projects ($1,000).
6/ Special authorization for these projects is highly desirable for the timely interagency planning and installation of interrelated projects.

TABLE C–68. WEST FORK SUBBASIN – PLAN FEATURES AND FINANCIAL DATA

| Project or program | Project no and priority[5/] | Purpose[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE STRUCTURAL MEASURES** | | | | | | |
| **EXISTING, UNDER CONSTRUCTION AND AUTHORIZED** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Cagles Mill (Existing) | 1–N/A | | | | 4,256 | |
| Big Walnut | 12-1 | | | | 40,864 | 45,120 |
| Upstream Watershed Projects | | | | | | |
| Prairie Creek (Daviess) (Existing) | 99-N/A | FC,R | | | 3,189 | |
| Lattas Creek (Existing) | 100-N/A | FC | | | 1,888 | |
| Mill Creek (Existing) | 101-N/A | FC,R | | | 8,655 | |
| Indian Creek | 102-1 | FC,R | | | 4,010 | |
| Prides Creek | 103-1 | FC,R | | | 1,541 | 19,283 |
| Local Protection Projects | | | | | | |
| Levee Unit 17 | 72-2 | FC | | | 1,254 | |
| Levee Unit 1[2/] | 70 | FC | | | | |
| Levee Unit 7[2/] | 71 | FC | | | | |
| Levee Unit 8[2/] | 34 | FC | | | | |
| Shufflebarger Levee[2/] | 76 | FC | | | | |
| McGinnis Levee[2/] | 73 | FC | | | | |
| Levee Unit 9[2/] | 47 | FC | | | | |
| Levee Unit 10[2/] | 48 | FC | | | | |
| Eel Levee Unit 1[2/] | 66 | FC | | | | |
| Eel Levee Unit 2[2/] | 65 | FC | | | | |
| Fletcher, Sunshine Gardens Levee[2/] | 64 | FC | | | | |
| Indianapolis-White River and Fall Creek (Channel) | 41-N/A | FC | | | 13,630 | |
| Anderson Local Protection[2/] | 42 | FC | | | | |
| Muncie Local Protection | 33-N/A | FC | | | 908 | 15,792 |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Parker | 19-1 | FC,R,WQ,WS | 31,884 | 11,916 | 43,800 | |
| Fall Creek (Highland) | 20-1 | FC,R,WQ,WS | 32,833 | 27,767 | 60,600 | 104,400 |
| Upstream Watershed Projects | | | | | | |
| Veale Creek | 131-1 | FC,R | 687 | 320 | 1,007 | |
| Black Creek [6/] | 132-1 | FC,R,WQ,D | 1,992 | 626 | 2,618 | |

TABLE C– 68 WEST FORK SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no. and priority 5/ | Purpose 1/ | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Lagoon Ditch, Wabash and Erie Canal 6/ | 133-3 | FC | 480 | 120 | 600 | |
| Splunge Creek | 134-2 | | --- | --- | | --- |
| Birch Creek | 135-2 | FC,WQ | 939 | 134 | 1,073 | |
| Jordan Creek | 136-2 | FC,R | 927 | 603 | 1,530 | |
| Croys Creek | 137-1 | FC,R | 983 | 614 | 1,597 | |
| Deer Creek 6/ | 138-3 | FC,R | 940 | 803 | 1,743 | |
| Little Walnut Creek | 139-1 | FC,R | 996 | 530 | 1,526 | |
| Rattlesnake Creek | 140-2 | FC,R | 823 | 680 | 1,503 | |
| Bryant Creek | 141-3 | FC,R | 229 | 181 | 410 | |
| Whitelick Creek 6/ | 142-1 | FC,R,WQ | 3,365 | 1,624 | 4,989 | |
| Killbuck Creek | 143-1 | FC,D | 611 | 252 | 863 | |
| Wilson Creek | 144-1 | FC,R,WQ,WS | 368 | 310 | 678 | 20,137 |
| Advanced Waste Treatment | – 1 | WQ | --- | 28,500 | 28,500 | 28,500 |
| Water Supply | – 1 | WS | --- | 2,500 | 2,500 | 2,500 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Upper Martinsville | 24-L/R | FC,R,WQ | 54,218 | 4,782 | 59,000 | 59,000 |
| Upstream Watershed Projects | | | | | | |
| Doans Creek | 211-L/R | FC,R | 527 | 398 | 925 | |
| Lick Creek | 212-L/R | FC,R | 1,019 | 488 | 1,507 | |
| Pond Creek | 213-L/R | FC | 36 | 9 | 45 | |
| Six Mile Creek | 214-L/R | FC,R | 548 | 273 | 821 | |
| Hog-McIntyre | 215-L/R | FC,R | 435 | 373 | 808 | |
| Fish Creek | 216-L/R | FC,R | 1,498 | 1,061 | 2,559 | |
| Burkhart Creek | 217-L/R | FC,R | 300 | 274 | 574 | |
| Clear Creek | 218-L/R | FC,R | 329 | 314 | 643 | |
| Pipe Creek | 219-L/R | FC,R | No Data Available | | | |
| Advanced Waste Treatment | – L/R | WQ | --- | 52,000 | 52,000 | 52,000 |
| Water Supply | – L/R | WS | --- | 48,000 | 48,000 | 48,000 |
| **EARLY ACTION AND LONG RANGE ENVIRONMENTAL, REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES** | | | | | | |
| Environmental Corridors | – 1 | E,R,FW | 3,750 | 3,750 | 7,500 | 7,500 |
| Stream Fishery | – 1 | E,R,FW | 1,521 | 1,521 | 3,042 | 3,042 |

TABLE C– 68 WEST FORK SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no. and priority[5] | Purpose[1] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Access Sites | – 1 | E,R | 260 | 260 | 520 | 520 |
| Flood Plain Management | – 1 | FC,E | 463 | --- | 463 | 463 |
| Use of Surface Mined Areas for Recreation | – 2 | E,R,FW | 2,070 | 2,070 | 4,140 | 4,140 |
| Land Treatment | – 1 | E,SC | 28,716 | 28,465 | 57,181 | 57,181 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Land Treatment | – L/R | E,SC | 11,775 | 11,671 | 23,446 | 23,446 |
| Flood Plain Management | – L/R | FC,E | 819 | | 819 | 819 |
| Use of Surface Mined Areas for Recreation | – L/R | E,R,FW | 5,850 | 5,850 | 11,700 | 11,700 |
| TOTALS[3] | | | | | | |
| Federal First Costs | | | 192,191 | | | |
| Non-Federal First Costs | | | | 239,039 | | |
| Subbasin Grand Total | | | | | 511,425[5] | 511,425[5] |

1/ Purpose index, see table 66. (Main Report)
2/ Authorized.
3/ Subbasin plan does not include basinwide measures.
4/ Priorities within Early Action Plan time frame (10-15 years)
1 – 1st five year period.
2 – 2nd five year period.
3 – 3rd five year period.
L/R – Long Range Plan (No priorities designated within Long Range Plan)
N/A – Not applicable.
5/ Includes $17,988 in costs for completed projects ($1,000).
6/ Special authorization for these projects is highly desirable for the timely interagency planning and installation of interrelated projects.

TABLE C–69. UPPER WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA

| Project or program | Project No. and priority[4/] | Program[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE STRUCTURAL MEASURES** | | | | | | |
| **EXISTING, UNDER CONSTRUCTION AND AUTHORIZED** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Huntington (Existing) | 6-N/A | FC,R | | | 19,432 | |
| Salamonie (Existing) | 4-N/A | FC,R | | | 16,403 | |
| Mississinewa (Existing) | 5-N/A | FC,R,WQ | | | 23,739 | |
| Lafayette | 7-1 | FC,R | | | 42,743 | 102,817 |
| Upstream Watershed Projects | | | | | | |
| Upper Wabash - Ohio | 95-N/A | FC,D | | | N/A | |
| Rock Creek - Wells County | 96-1 | FC,D | | | 5,345 | |
| Mill Creek - Fulton County (Existing) | 101-N/A | FC,D | | | 937 | |
| Bachelor Run (Existing) | 98-N/A | FC,D | | | 1,051 | 7,333 |
| *Local Protection Projects* | | | | | | |
| Deer Creek - Prairie Levee[2/] | 55-L/R | FC | | | | |
| Delphi Local Protection | 37-N/A | FC | | | 162 | |
| Marion Local Protection | 79-1 | FC | | | 1,560 | 1,722 |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Upstream Watershed Projects | | | | | | |
| Clear Creek | 115-2 | FC,D | 310 | 167 | 477 | |
| Little River[6/] | 116-2 | FC,D,R,WQ | 3,767 | 773 | 4,540 | |
| Buckeye Hoosier[6/] | 117-1 | FC,D,R,WQ | 6,807 | 2,873 | 9,680 | |
| Salamonie River | 118-1 | FC,D,R | 3,435 | 911 | 4,346 | |
| Pony Creek | 119-2 | FC,D | 337 | 90 | 427 | |
| Lower Mississinewa River | 120-2 | FC,R,FW | 533 | 451 | 984 | |
| Upper Mississinewa River | 121-2 | FC,D | 1,997 | 545 | 2,542 | |
| Brown Hill | 122-3 | FC,D | 864 | 578 | 1,442 | |
| Big Monon Ditch | 123-3 | FC,D | 3,018 | 1,501 | 4,519 | |
| House-Bartee | 124-2 | FC,D | 572 | 222 | 794 | |
| Mud Creek | 125-3 | FC,D | 1,373 | 690 | 2,063 | |
| Sugar Creek | 126-3 | FC,D,R | 1,072 | 958 | 2,030 | |
| Rock Creek | 127-1 | FC,D | 753 | 289 | 1,042 | |
| Burnetts Creek | 128-3 | FC,D | 183 | 72 | 255 | |
| Crooked Creek | 129-3 | FC,D | 291 | 80 | 371 | |
| Goose Creek | 130-1 | FC,R | --- | --- | --- | 35,512 |
| Advanced Waste Treatment | | | | | | |
| (Indiana) | – 1 | WQ | --- | 14,000 | 14,900 | |
| (Ohio) | | | | 900 | 14,900 | 14,900 |

TABLE C–69. UPPER WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no. and priority[4/] | Program[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Water Supply (Indiana) | – 1 | WS | --- | 6,550 | 6,550 | 6,550 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Major Reservoirs | | | | | | |
| Deer Creek | 25-L/R | FC,R | 25,730 | 2,670 | 28,400 | |
| Denver | 26-L/R | FC,R | 40,935 | 5,465 | 46,400 | |
| Pipe Creek | 27-L/R | FC,R | 19,014 | 2,186 | 21,200 | |
| Upper Delphi | 28-L/R | FC,R | 72,452 | 4,448 | 76,900 | 172,900 |
| Upstream Watershed Project | | | | | | |
| Scuffle Creek | 200-L/R | FC,D | 122 | 57 | 179 | |
| Eel River | 201-L/R | FC | No data available | | | |
| Timmons Ditch | 202-L/R | FC,D | 148 | 80 | 228 | |
| Ackerman Ditch | 203-L/R | FC,D | 107 | 58 | 165 | |
| Quigley Marsh Ditch | 204-L/R | FC,D | 87 | 47 | 134 | |
| Fell Taylor Ditch | 205-L/R | FC,D | 70 | 38 | 108 | |
| Chapman Ditch | 206-L/R | FC,D | 34 | 18 | 52 | |
| South Fork Wildcat Creek | 207-L/R | FC,D | No data available | | | |
| Deer Creek | 208-L/R | FC,D | 2,676 | 2,420 | 5,096 | |
| Pleasant Run Creek | 209-L/R | FC,D | 68 | 36 | 104 | |
| Rattlesnake Creek | 210-L/R | FC,D | 293 | 157 | 450 | 6,516 |
| Advanced Waste Treatment | | | | | | |
| (Indiana) | – L/R | WQ | --- | 22,000 | | |
| (Ohio) | | | | 1,000 | 23,000 | 23,000 |
| Water Supply | | | | | | |
| (Indiana) | – L/R | WS | --- | 44,900 | | |
| (Ohio) | | | | 100 | 45,000 | 45,000 |
| **EARLY ACTION AND LONG RANGE ENVIRONMENTAL, REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES** | | | | | | |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Environmental Corridors | | | | | | |
| (Indiana) | – 1 | E,R,FW | 7,975 | 7,975 | | |
| (Ohio) | | | | 0 | 15,950 | 15,950 |
| Stream Fishery | | | | | | |
| (Indiana) | – 1 | E,R,FW | 2,053 | 2,053 | | |
| (Ohio) | | | | 0 | 4,106 | 4,106 |

TABLE C–69. UPPER WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no. and priority[4/] | Program[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Access Sites | | | | | | |
| (Indiana) | – 1 | E,R,FW | 442 | 442 | | |
| (Ohio) | | | | 0 | 884 | 884 |
| Flood Plain Management | | | | | | |
| (Indiana) | – 1 | FC,E | 311 | --- | 311 | 311 |
| Use of Surface Mined Areas for Recreation (Indiana) | – 2 | E,R,FW | 775 | 775 | | |
| (Ohio) | | | | 0 | 1,550 | 1,550 |
| Land Treatment | | | | | | |
| (Indiana) | – 1 | E,SC | 44,123 | 41,112 | | |
| (Ohio) | | | | 2,624 | 87,859 | 87,859 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Land Treatment (Indiana) | – L/R | E,SC | 19,266 | 17,951 | | |
| (Ohio) | | | | 1,146 | 38,363 | 38,363 |
| Flood Plain Management | | | | | | |
| (Indiana) | – L/R | FC,E | 598 | --- | 598 | 598 |
| Use of Surface Mined Areas for Recreation | – L/R | E,R,FW | 2,200 | 2,200 | 4,400 | 4,400 |
| TOTALS[3/] | | | | | | |
| Federal First Costs | | | 264,791 | | | |
| Non-Federal First Costs | | | | | | |
| (Indiana) | | | | 187,838 | | |
| (Ohio) | | | | 5,770 | | |
| Subbasin Grand Total | | | | | 569,771[5/] | 569,991[5/] |

1/ Purpose index, see table 66. (Main Report)
2/ Authorized.
3/ Subbasin plan does not include basinwide measures.
4/ Priorities within Early Action Plan time frame (10-15 years)
1 - 1st five year period.
2 - 2nd five year period.
3 - 3rd five year period.
L/R - Long Range Plan (No priorities designated within Long Range Plan)
N/A - Not applicable.
5/ Includes $61,724 in costs for completed projects ($1,000).
6/ Special authorization for these projects is highly desirable for the timely interagency planning and installation of interrelated projects.

TABLE C– 70 MIDDLE WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA

| Project or program | Project no and priority[4/] | Purpose[1/] | Federal first costs ($1,000) | Non-federal first costs ($1,000) | Project first costs ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE STRUCTURAL MEASURES** | | | | | | |
| **EXISTING, UNDER CONSTRUCTION AND AUTHORIZED** | | | | | | |
| Major Reservoirs | | | | | | |
| Mansfield (Indiana)(Existing) | 2-N/A | FC,R | | | 6,280 | |
| Big Pine (Indiana) | 8-1 | FC,R | | | 24,567 | 30,847 |
| Upstream Watershed Projects | | | | | | |
| Busseron Creek (Indiana) (Existing) | 109-N/A | FC,WS,R | | | 9,671 | |
| Little Wea Creek (Indiana) | 94-N/A | N/A | | | N/A | |
| Kickapoo Creek (Indiana) | 110-N/A | FC,D | | | 418 | |
| Prairie Creek (Vigo County) (Indiana) | 111-N/A | FC,D | | | 787 | |
| Little Raccoon Creek (Indiana) | 112-N/A | FC,R | | | 4,799 | 15,675 |
| Local Protection Projects | | | | | | |
| Adams[2/] (Indiana) | 53 | FC | | | | |
| Raccoon[2/] (Indiana) | 75 | FC | | | | |
| Lyford (Indiana) (Existing) | 32-N/A | FC | | | 291 | |
| Clinton[2/] (Indiana) | 54 | FC | | | | |
| Conover (Indiana) (Existing) | 36-N/A | FC | | | 15 | |
| West Terre Haute (Indiana) | 57-1 | FC | | | 1,290 | |
| Sugar Creek[2/] (Indiana) | 50 | FC | | | | |
| Honey Creek[2/] (Indiana) | 56 | FC | | | | |
| Greenfield Bayou (Indiana) | 59-1 | FC | | | 3,221 | |
| Levee Unit 6 (Illinois) | 52-1 | FC | | | 1,216 | |
| Island (Indiana) | 60-1 | FC | | | 2,094 | |
| Tri Pond (Illinois) | 62-1 | FC | | | 2,050 | |
| Gill Township (Indiana) (Existing) | 31-N/A | FC | | | 581 | |
| Niblack (Indiana) (Existing) | 40-N/A | FC | | | 2,574 | |
| Russell and Allison (Illinois) | 51-1 | FC | | | 7,365 | |
| England Pond (Illinois) | 58-1 | FC | | | 932 | |
| Vincennes (Indiana) (Existing) | 38-N/A | FC | | | 6,120 | |
| Brevoort (Indiana) (Existing) | 30-N/A | FC | | | 3,585 | 31,334 |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Major Reservoirs | | | | | | |
| Crawfordsville (Indiana) | 21-1 | FC,WS,R,WQ | 24,996 | 3,904 | 28,900 | |
| Salt Fork (Illinois) | 22-2 | FC,R,WQ | 31,995 | 4,205 | 36,200 | 65,100 |

TABLE C–70. MIDDLE WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority[4/] | Purpose[1/] | Federal first costs ($1,000) | Non-federal first costs ($1,000) | Project first costs ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Upstream Watershed Projects | | | | | | |
| Raccoon Creek (Illinois) | 159-3 | FC,D | 1,170 | 349 | 1,519 | |
| Snapp-Kelso (Indiana) | 161-1 | FC,R | 506 | 428 | 934 | |
| Mariah Creek (Indiana) | 162-1 | FC,D,R | 969 | 282 | 1,251 | |
| Turtle Creek (Indiana) | 164-2 | FC,R,I | 928 | 477 | 1,405 | |
| Mill Creek (Indiana) | 164-1 | FC,R | 1,939 | 1,084 | 3,023 | |
| Honey Creek (Indiana) | 167-2 | FC,R | 3,249 | 936 | 4,185 | |
| Otter Creek (Indiana) | 169-1 | FC,R | 2,371 | 1,613 | 3,984 | |
| Coal Creek (Indiana) [6/] | 170-2 | FC,R | 1,269 | 673 | 1,942 | |
| Big Raccoon Creek (Indiana) | 173-1 | FC,R,FW | 1,722 | 714 | 2,436 | |
| Jordan Creek (Indiana) | 174-1 | FC,D | 585 | 210 | 795 | |
| Lye Creek (Indiana) [6/] | 175-1 | FC,D | 791 | 420 | 1,211 | |
| Fall Creek (Indiana) | 171-1 | FC,R | 193 | 181 | 374 | |
| Vieke Ditch (Indiana) | 158-3 | FC,D | 364 | 114 | 478 | |
| City Ditch (Indiana) | 160-3 | FC,D | 253 | 83 | 336 | |
| Sugar Creek (Illinois) | 168-1 | FC,WS,WQ | 875 | 902 | 1,777 | |
| Lower Shaker Prairie (Indiana) | 163-3 | FC,D | 243 | 70 | 313 | |
| Snyder Creek (Illinois) [6/] | 166-1 | FC | 262 | 65 | 327 | |
| Feather Creek (Indiana) | 172-1 | FC,R | 767 | 504 | 1,271 | 27,555 |
| Advanced Waste Treatment | | | | | | |
| (Illinois) | – 1 | WQ | --- | 8,000 | | |
| (Indiana) | | | | 4,000 | 12,000 | 12,000 |
| Mine Pollution Abatement | | | | | | |
| (Indiana) | – 2 | WQ | 1,000 | 1,000 | 2,000 | 2,000 |
| Water Supply | | | | | | |
| (Illinois) | – 1 | WS | | 2,300 | | |
| (Indiana) | | | | 4,220 | 6,520 | 6,520 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Major Reservoir Projects | | | | | | |
| Coal Creek (Indiana) | 29-L/R | FC,R | 16,835 | 2,165 | 19,000 | 19,000 |
| Upstream Watershed Projects | | | | | | |
| Crawfish Creek (Illinois) | 229-L/R | FC,D | 147 | 37 | 184 | |
| Turman Creek (Illinois) | 230-L/R | FC | 610 | 153 | 763 | |
| Raccoon Creek (Illinois) | 231-L/R | FC,R | 778 | 442 | 1,220 | |
| Big Creek (Illinois) | 232-L/R | FC,R | 1,491 | 935 | 2,426 | |
| Clear Creek (Illinois) | 233-L/R | FC,R | 1,277 | 945 | 2,222 | |
| Lost Creek (Indiana) | 234-L/R | FC | 341 | 85 | 426 | |

TABLE C–70. MIDDLE WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority[4/] | Purpose[1/] | Federal first costs ($1,000) | Non-federal first costs ($1,000) | Project first costs ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Norton Creek (Indiana) | 235-L/R | FC,R | 644 | 469 | 1,113 | |
| Big Shawnee Creek (Indiana) | 236-L/R | FC,D | 460 | 248 | 708 | |
| Coal Branch (Indiana) | 237-L/R | FC | 169 | 42 | 211 | |
| Stony Creek (Illinois) | 238-L/R | FC,D | 370 | 200 | 570 | |
| Sugar Mill Creek (Indiana) | 239-L/R | FC,R | 802 | 413 | 1,215 | |
| Little Sugar Creek (Indiana) | 240 | FC,D | 111 | 66 | 177 | |
| Advanced Waste Treatment | | | | | | |
| (Illinois) | – L/R | WQ | | 11,000 | | |
| (Indiana) | | | | 13,000 | 24,000 | 24,000 |
| Water Supply | | | | | | |
| (Illinois) | – L/R | WS | | 19,000 | | |
| (Indiana) | | | | 32,000 | 51,000 | 51,000 |
| EARLY ACTION AND LONG RANGE ENVIRONMENTAL, REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES | | | | | | |
| RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN | | | | | | |
| Environmental Corridors | | | | | | |
| (Illinois) | – 1 | E,R,FW | 7,218 | 5,256 | | |
| (Indiana) | | | | 1,962 | 14,436 | 14,436 |
| Stream Fishery | | | | | | |
| (Illinois) | – 1 | E,R,FW | 2,359 | 1,353 | | |
| (Indiana) | | | | 1,006 | 4,718 | 4,718 |
| Access Sites | | | | | | |
| (Illinois) | – 1 | E,R | 403 | 205 | | |
| (Indiana) | | | | 198 | 806 | 806 |
| Flood Plain Management | – 1 | FC,E | 294 | | 294 | 294 |
| Use of Surface Mined Areas for Recreation (Illinois) | – 2 | E,R,FW | 1,420 | 710 | | |
| (Indiana) | | | | 710 | 2,840 | 2,840 |
| Land Treatment | | | | | | |
| (Illinois) | – 1 | E,SC | 19,315 | 10,482 | | |
| (Indiana) | | | | 8,693 | 38,490 | 38,490 |
| RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN | | | | | | |
| Land Treatment | | | | | | |
| (Illinois) | – L/R | | 9,193 | 4,249 | | |
| (Indiana) | | | | 4,863 | 18,305 | 18,305 |

TABLE C– 70 MIDDLE WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority[4/] | Purpose[1/] | Federal first costs ($1,000) | Non-federal first costs ($1,000) | Project first costs ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Flood Plain Management | – L/R | FC,E | 606 | --- | 606 | 606 |
| Use of Surface Mined Areas for Recreation (Illinois) | – L/R | E,R,FW | 4,020 | 2,010 | | |
| (Indiana) | | | | 2,010 | 8,040 | 8,040 |
| TOTALS[3/] | | | | | | |
| Federal First Costs | | | 145,310 | | | |
| Non-Federal First Costs | | | | | | |
| (Indiana) | | | | 86,678 | | |
| (Illinois) | | | | 72,798 | | |
| Subbasin Grand Total | | | | | 382,642[5/] | 382,642[5/] |

1/ Purpose index, see table 66. (Main Report)
2/ Authorized.
3/ Subbasin plan does not include basinwide measures.
4/ Priorities within Early Action Plan time frame (10-15 years).
1 - 1st five year period.
2 - 2nd five year period.
3 - 3rd five year period.
L/R - Long Range Plan (No priorities designated within Long Range Plan).
N/A - Not applicable.
5/ Includes $29,117 in costs for constructed projects ($1,000).
6/ Special authorization for these project is highly desirable for the timely interagency planning and installation of interrelated projects.

TABLE C– 71. EMBARRAS SUBBASIN – PLAN FEATURES AND FINANCIAL DATA

| Project or program | Project no and priority[3/] | Purpose[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Total ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE STRUCTURAL MEASURES** | | | | | | |
| **EXISTING, UNDER CONSTRUCTION AND AUTHORIZED** | | | | | | |
| Major Reservoirs | | | | | | |
| Lincoln | 9-1 | FC,R,WS,WQ | 42,706 | 2,742 | 45,448 | 45,448 |
| Upstream Watershed Projects | | | | | | |
| Scattering Fork | 113-1 | | | | 1,376 | 1,376 |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Upstream Watershed Projects | | | | | | |
| Muddy Creek (17g-5) | 177-1 | FC,D,WQ | 1,291 | 452 | 1,743 | |
| Muddy Creek (17g-21)[4/] | 180-1 | FC,R,WQ,WS | 2,707 | 1,736 | 4,443 | |
| North Fork Embarras River[4/] | 178-1 | FC,R,WQ,WS | 7,167 | 3,270 | 10,437 | |
| Crooked Creek[4/] | 179-3 | FC,R | 1,295 | 446 | 1,741 | |
| Brushy-Birch Creek | 176-1 | FC,R,WQ | 1,321 | 551 | 1,872 | 20,236 |
| Advanced Waste Treatment | – 1 | WQ | --- | 1,560 | 1,560 | 1,560 |
| Water Supply | – 1 | WS | --- | 750 | 750 | 750 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Upstream Watershed Projects | | | | | | |
| Otter-Beaver-Allison Creeks | 241-L/R | FC,D | 950 | 512 | 1,462 | |
| Honey Creek | 242-L/R | FC,R | 815 | 355 | 1,170 | |
| Range Creek | 243-L/R | FC,R | 1,686 | 692 | 2,378 | |
| Hurricane Creek | 244=L/R | FC | 829 | 208 | 1,037 | 6,047 |
| Advanced Waste Treatment | – L/R | WQ | | 2,000 | 2,000 | 2,000 |
| Water Supply | – L/R | WS | | 5,000 | 5,000 | 5,000 |
| **EARLY ACTION AND LONG RANGE ENVIRONMENTAL, REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES** | | | | | | |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Environmental Corridors | – 1 | E,R,FW | 1,385 | 1,385 | 2,770 | 2,770 |
| Stream Fishery | – 1 | E,R,FW | 700 | 700 | 1,400 | 1,400 |

TABLE C– 71. EMBARRAS SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority 3/ | Purpose 1/ | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Total ($1,000) |
|---|---|---|---|---|---|---|
| Access Sites | – 1 | E,R,FW | 105 | 105 | 210 | 210 |
| Flood Plain Management | – 1 | FC,E | 122 | | 122 | 122 |
| Use of Surface Mined Areas for Recreation | – 2 | E,R,FW | 775 | 775 | 1,550 | 1,550 |
| Land Treatment | – 1 | E,SC | 8,813 | 8,735 | 17,548 | 17,548 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Land Treatment | – L/R | E,SC | 3,576 | 3,545 | 7,121 | 7,121 |
| Flood Plain Management | – L/R | FC,E | 294 | | 294 | 294 |
| Use of Surface Mined Areas for Recreation | – L/R | E,R,FW | 2,200 | 2,200 | 4,400 | 4,400 |
| TOTALS 2/ | | | | | | |
| Federal First Cost | | | 78,737 | | | |
| Non-Federal First Cost | | | | 37,719 | | |
| Subbasin Grand Total | | | | | 117,832 | 117,832 |

1/ Purpose index, see table 66. (Main Report)
2/ Subbasin plan does not include basinwide measures.
3/ Priorities within Early Action Plan time frame (10-15 years).
1 - 1st five year period.
2 - 2nd five year period.
3 - 3rd five year period.
L/R - Long Range Plan (No priorities designated within Long Range Plan).
N/A - Not applicable.
4/ Special authorization for these projects is highly desirable for the timely interagency planning and installation of interrelated projects.

TABLE C– 72 LITTLE WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA

| Project or program | Project no and priority[4] | Purpose[1] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Total ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE STRUCTURAL MEASURES** | | | | | | |
| **EXISTING, UNDER CONSTRUCTION AND AUTHORIZED** | | | | | | |
| Major Reservoirs | | | | | | |
| Helm | 15-2 | FC,R | | | 23,500 | |
| Louisville | 16-1 | FC,R | | | 30,900 | 54,400 |
| Upstream Watershed Projects | | | | | | |
| Seven Mile Creek | 114-1 | FC | | | 1,992 | 1,992 |
| Local Protection Projects | | | | | | |
| Levee Unit 1[2] | 68-N/A | FC | | | | |
| Levee Unit 2[2] | 67-N/A | FC | | | | |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Upstream Watershed Projects | | | | | | |
| Lick Creek[5] | 187-2 | FC,R | 747 | 499 | 1,246 | |
| Auxier-Big Creek[5] | 188-1 | FC,R,WS,D | 2,678 | 2,273 | 4,951 | |
| Big Mound Creek | 189-2 | FC,D | 675 | 297 | 972 | |
| Pond Creek[5] | 192-1 | FC,R | 1,068 | 547 | 1,615 | |
| Big Muddy Creek[5] | 194-1 | FC,R | 3,638 | 1,374 | 5,012 | |
| Dry Fork[5] | 190-2 | FC,R,WS | 1,890 | 774 | 2,664 | |
| Horse Creek[5] | 191-2 | FC,R,WS | 2,379 | 1,003 | 3,382 | |
| Upper Little Wabash River[5] | 196-1 | FC,WS,WQ | 2,818 | 528 | 3,346 | |
| Fox River[5] | 193-1 | FC,R,WS,WQ | 4,077 | 1,026 | 5,103 | 30,363 |
| Salt Creek[5] | 195-1 | FC,R | 1,439 | 633 | 2,072 | |
| Local Protection Projects | | | | | | |
| Levee Unit 7 | 79a-3 | FC | 670 | 26 | 696 | |
| Levee Unit 8 | 79b-3 | FC | 780 | 30 | 810 | 1,506 |
| Advanced Waste Treatment | – 1 | WQ | --- | 4,980 | 4,980 | 4,980 |
| Water Supply | – 1 | WS | --- | 310 | 310 | 310 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Upstream Watershed Projects | | | | | | |
| Limekiln Creek | 247-L/R | FC,D | 77 | 42 | 119 | |
| Lost Creek | 248-L/R | FC | 390 | 98 | 488 | |

TABLE C–72. LITTLE WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority 4/ | Purpose 1/ | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Total ($1,000) |
|---|---|---|---|---|---|---|
| Beaver Creek | 249-L/R | FC | 188 | 47 | 235 | |
| Prairie Creek | 250-L/R | FC,D | 88 | 47 | 135 | |
| Nameless Creek | 251-L/R | FC,WS | 154 | 204 | 358 | |
| Brush Creek | 252-L/R | FC | 998 | 250 | 1,248 | |
| Elliott Creek | 253-L/R | FC | 128 | 32 | 160 | |
| Big Creek | 254-L/R | FC | No data available | | | |
| Elm River | 255-L/R | FC,R | 6,388 | 2,238 | 8,626 | |
| Panther Creek | 256-L/R | FC | 602 | 151 | 753 | |
| Crooked Creek | 257-L/R | FC | 320 | 80 | 400 | |
| Dismal Creek | 258-L/R | FC | 453 | 113 | 566 | |
| Bishop Creek | 259-L/R | FC,WS | 581 | 181 | 762 | |
| Local Protection Projects | | | | | | |
| Levee Unit 3 | 90a-L/R | FC | 2,030 | 280 | 2,310 | |
| Levee Unit 9 | 90b-L/R | FC | 520 | 80 | 600 | 2,910 |
| Advanced Waste Treatment | – L/R | WS | --- | 3,000 | 3,000 | 3,000 |
| Water Supply | – L/R | WS | --- | 8,000 | 8,000 | 8,000 |
| **EARLY ACTION AND LONG RANGE ENVIRONMENTAL REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES** | | | | | | |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Environmental Corridors | – 1 | E,R,FW | 1,296 | 1,296 | 2,595 | 2,592 |
| Stream Fishery | – 1 | E,R,FW | 602 | 602 | 1,204 | 1,204 |
| Access Sites | – 1 | E,R,FW | 37 | 37 | 74 | 74 |
| Flood Plain Management | – 1 | FC,E | 150 | --- | 150 | 150 |
| Use of Surface Mined Areas for Recreation | – 2 | E,R,FW | 258 | 258 | 516 | 516 |
| Land Treatment | – 1 | E,SC | 11,701 | 11,599 | 23,300 | 23,300 |
| **RECOMMENDED FOR INCLUSTION IN LONG RANGE PLAN** | | | | | | |
| Land Treatment | – L/R | E,SC | 4,572 | 4,531 | 9,103 | 9,103 |
| Flood Plain Management | – L/R | FC,E | 353 | --- | 353 | 353 |
| Use of Surface Mined Areas for Recreation | – L/R | E,R,FW | 730 | 730 | 1,460 | 1,460 |

TABLE C– 72 LITTLE WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority[4/] | Purpose[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Total ($1,000) |
|---|---|---|---|---|---|---|
| TOTALS[3/] | | | | | | |
| Federal First Cost | | | 55,475 | | | |
| Non-Federal First Cost | | | | 48,196 | | |
| Subbasin Grand Total | | | | | 160,063 | 160,063 |

1/ Purpose index, see table 66. (Main Report)
2/ Authorized.
3/ Subbasin plan does not include basinwide measures.
4/ Priorities within Early Action Plan time frame (10-15 years).
1 - 1st five year period.
2 - 2nd five year period.
3 - 3rd five year period.
L/R - Long Range Plan (No priorities designated within Long Range Plan).
N/A - Not applicable.
5/ Special authorization for these projects is highly desirable for the timely interagency planning and installation of interrelated projects.

TABLE C–73. LOWER WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA

| Project or program | Project no and priority[4/] | Purpose[1/] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Total ($1,000) |
|---|---|---|---|---|---|---|
| **EARLY ACTION AND LONG RANGE STRUCTURAL MEASURES** | | | | | | |
| **EXISTING, UNDER CONSTRUCTION AND AUTHORIZED** | | | | | | |
| Local Protection Projects | | | | | | |
| Mt. Carmel (Illinois) (Existing) | 78-N/A | FC | | | 2,081 | |
| Rochester-McCleary's Bluff (Illinois) | 61-1 | FC | | | 1,310 | |
| Levee Unit 5 (Indiana (Existing) | 35-N/A | FC | | | 5,471 | |
| Bonpas Channel (Illinois) | 63-2 | FC | | | 1,263 | |
| New Harmony[2/] (Indiana) | 74 | FC | | | | |
| Levee Units 3 and 4 (Illinois) | 46-3 | FC | | | 15,580 | |
| Levee Units 2 (Indiana) | 69-2 | FC | | | 2,119 | |
| Levee Unit 1 (Illinois) | 70-2 | FC | | | 4,526 | 32,350 |

TABLE C–73. LOWER WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no and priority [4] | Purpose [1] | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Total ($1,000) |
|---|---|---|---|---|---|---|
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Upstream Watershed Projects | | | | | | |
| Big Creek (Indiana) | 182-2 | FC,R,D | 4,390 | 1,612 | 6,002 | |
| Gresham Creek (Indiana) | 193-1 | FC,R,D | 1,362 | 883 | 2,245 | |
| McHenry-Hawthorne (Indiana) | 184-3 | N/A | --- | --- | --- | |
| Scott Ditch-Coffee Bayou (Indiana) | 185-3 | FC,R,D | 1,731 | 1,249 | 2,980 | |
| Bonpas Creek (Illinois) [6] | 186-1 | FC,R,WQ,D,WS | 5,147 | 2,595 | 7,742 | 18,969 |
| Local Protection Projects | | | | | | |
| Levee Unit 50 (Indiana) | 90-3 | FC | 545 | 62 | 607 | 607 |
| Advanced Waste Treatment | – 1 | WQ | --- | --- | --- | --- |
| Water Supply | | | | | | |
| (Illinois) | – 1 | WS | --- | 40 | 220 | 220 |
| (Indiana) | – 1 | | | 180 | 220 | 220 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Upstream Watershed Projects | | | | | | |
| Black River (Indiana) | 245-L/R | FC,R | 1,320 | 514 | 1,834 | |
| French Creek (Illinois) | 246-L/R | FC,R | 830 | 555 | 1,385 | 3,219 |
| Advanced Waste Treatment | – L/R | WQ | --- | --- | --- | --- |
| Water Supply (Indiana) | – L/R | WS | --- | 1,000 | 1,000 | 1,000 |
| **EARLY ACTION AND LONG RANGE ENVIRONMENTAL, REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES** | | | | | | |
| **RECOMMENDED FOR INCLUSION IN EARLY ACTION PLAN** | | | | | | |
| Environmental Corridors | | | | | | |
| (Illinois) | – 1 | E,R,FW | 810 | 666 | 1,620 | 1,620 |
| (Indiana) | – 1 | | | 144 | 1,620 | 1,620 |
| Stream Fishery | | | | | | |
| (Illinois) | – 1 | E,R,FW | 514 | 249 | 1,028 | 1,028 |
| (Indiana) | – 1 | | | 265 | 1,028 | 1,028 |

TABLE C–73. LOWER WABASH SUBBASIN – PLAN FEATURES AND FINANCIAL DATA (CONT'D)

| Project or program | Project no. and priority 4/ | Purpose 1/ | Federal first cost ($1,000) | Non-federal first cost ($1,000) | Project first cost ($1,000) | Totals ($1,000) |
|---|---|---|---|---|---|---|
| Access Sites | | | | | | |
| (Illinois) | – 1 | E,R,FW | 69 | 34 | 138 | 138 |
| (Indiana) | – 1 | | | 35 | 138 | 138 |
| Flood Plain Management | – 1 | FC,E | 75 | --- | 75 | 75 |
| Use of Surface Mined Areas for Recreation (Indiana) | – 2 | E,R,FW | 125 | 125 | 250 | 250 |
| Land Treatment | | | | | | |
| (Illinois) | – 1 | E,SC | 4,870 | 1,747 | | |
| (Indiana) | – 1 | | | 3,080 | 9,697 | 9,697 |
| **RECOMMENDED FOR INCLUSION IN LONG RANGE PLAN** | | | | | | |
| Land Treatment | | | | | | |
| (Illinois) | – L/R | E,SC | 2,122 | 708 | | |
| (Indiana) | – L/R | | | 1,396 | 4,226 | 4,226 |
| Flood Plain Management | – L/R | FC,E | 100 | --- | 100 | 100 |
| Use of Surface Mined Areas for Recreation (Indiana) | – L/R | E,R,FW | 360 | 360 | 730 | 730 |
| TOTALS 3/ | | | | | | |
| Federal First Cost | | | 24,370 | | | |
| Non Federal First Cost | | | | | | |
| (Illinois) | | | | 6,594 | | |
| (Indiana) | | | | 10,905 | | |
| Subbasin Grand Total | | | | | 74,219 5/ | 74,219 5/ |

1/ Purpose index, see table 66. (Main Report)
2/ Authorized.
3/ Subbasin plan does not include basinwide measures.
4/ Priorities within Early Action Plan time frame (10-15 years).
1 - 1st five year period.
2 - 2nd five year period.
3 - 3rd five year period.
L/R - Long Range Plan. (No priorities designated within Long Range Plan).
N/A - Not applicable.
5/ Includes $7,552 in costs for constructed projects ($1,000).
6/ Special authorization for these projects is highly desirable for the timely interagency planning and installation of interrelated projects.

## TABLE C–74. SUMMARY OF PLAN FEATURES AND FINANCIAL DATA FOR WABASH BASIN

| | Early Action Plan | | | | | | | | | | Long Range Plan | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Structural Element Cost ($1,000) | | Land Treatment Element Cost ($1,000) | | Environmental Corridors ($1,000) | | Flood Plain Management ($1,000) | | Use of Surface Mined Areas ($1,000) | | Structural Element Cost ($1,000) | | Land Treatment Element Cost ($1,000) | | Flood Plain Management ($1,000) | | Use of Surface Mined Areas ($1,000) | |
| Subbasin | Federal | Non-Federal | Federal | Non-Federal | Federal | Non-Federal | Federal | Non-Federal | Federal | Non-Federal | Federal | Non-Federal | Federal | Non-Federal | Federal | Non-Federal | Federal | Non-Federal |
| Patoka | 15,890 | 4,154 1/ | 3,108 | 3,080 1/ | 1,832 | 1,832 1/ | 63 | — | 257 | 257 1/ | 7,591 | 6,261 1/ | 1,411 | 1,398 1/ | 50 | — | 730 | 730 1/ |
| East Fork | 81,810 | 39,208 1/ | 24,073 | 23,863 1/ | 8,226 | 8,226 1/ | 302 | — | 775 | 775 1/ | 4,520 | 35,961 1/ | 10,507 | 10,415 1/ | 490 | — | 2,200 | 2,200 1/ |
| West Fork | 78,057 | 77,480 1/ | 28,716 | 28,465 1/ | 5,531 | 5,531 1/ | 463 | — | 2,070 | 2,070 1/ | 58,910 | 107,972 1/ | 11,775 | 11,671 1/ | 819 | — | 5,850 | 5,850 1/ |
| Upper Wabash | 25,312 | 30,750 1/<br>900 2/ | 44,123 | 41,112 1/<br>2,624 2/ | 10,470 | 10,470 1/<br>— | 311 | —<br>— | 775 | 775 1/<br>— | 161,736 | 84,580 1/<br>1,100 2/ | 19,266 | 17,951 1/<br>1,146 2/ | 598 | —<br>— | 2,200 | 2,200 1/<br>— |
| Middle Wabash | 76,447 | 15,821 3/<br>20,913 1/ | 19,315 | 10,482 3/<br>8,693 1/ | 9,980 | 6,814 3/<br>3,166 1/ | 294 | —<br>— | 1,420 | 710 3/<br>710 1/ | 24,035 | 32,712 3/<br>46,323 1/ | 9,193 | 4,249 3/<br>4,863 1/ | 606 | —<br>— | 4,020 | 2,010 3/<br>2,010 1/ |
| Embarras | 56,487 | 11,507 3/ | 8,813 | 8,735 3/ | 2,190 | 2,190 3/ | 122 | — | 775 | 775 3/ | 4,280 | 8,767 3/ | 3,576 | 3,545 3/ | 294 | — | 2,200 | 2,200 3/ |
| Little Wabash | 22,859 | 14,300 3/ | 11,701 | 11,599 3/ | 1,935 | 1,935 3/ | 150 | — | 258 | 258 3/ | 12,917 | 14,843 3/ | 4,572 | 4,531 2/ | 353 | — | 730 | 730 3/ |
| Lower Wabash | 13,175 | 2,635 3/<br>3,986 1/ | 4,870 | 1,747 3/<br>3,080 1/ | 1,393 | 949 3/<br>444 1/ | 75 | —<br>— | 125 | —<br>125 1/ | 2,150 | 555 3/<br>1,514 1/ | 2,122 | 708 3/<br>1,396 1/ | 100 | —<br>— | 360 | —<br>360 1/ |
| TOTAL | 370,037 | | 144,719 | | 41,557 | | 1,780 | | 6,455 | | 276,139 | | 62,422 | | 3,310 | | 18,290 | |
| Indiana | | 176,491 | | 108,293 | | 29,669 | | — | | 4,712 | | 282,611 | | 47,694 | | — | | 13,350 |
| Ohio | | 900 | | 2,624 | | — | | — | | — | | 1,100 | | 1,146 | | — | | — |
| Illinois | | 44,263 | | 32,563 | | 11,888 | | — | | 1,743 | | 56,877 | | 13,033 | | — | | 4,940 |

1/ Indiana
2/ Ohio
3/ Illinois

## SECTION XVI – RECOMMENDATIONS OF PLAN FORMULATION SUBCOMMITTEE TO COORDINATING COMMITTEE

The recommendations are arranged in three basic categories, namely – philosophical, policy – legislative and implementary.

### 72. PHILOSOPHICAL

#### a. General

That the sound development and management of the Basin's water and related land resources is vital to sustaining a desirable posture of health, welfare and economic stability of the basin.

That other existing programs that contribute to improvement of the health and welfare of the Basin's present and future populace be continued and increased where appropriate.

That other new programs that would contribute to an improved quality of living in the basin be developed and implemented.

Plan elements should be integrated for development and management in accord with their formulation, as a subbasin system.

#### b. Specific

Water Quality – That regionalized management be encouraged in developing solutions to water quality problems of more than local people, without closing off options for individual initiative and ingenuity.

Ground Water Use – That due to inherent advantages with regard to treatment and easy availability, ground water be utilized for water supply to the capability of the aquifer, without, however, exceeding the average recharge rate, and that present ground water studies be expanded to locate and determine the potential of aquifers in the basin.

Water Reuse Systems – The research and demonstration of efficient, safe and workable water reuse systems after advanced waste treatment in the interest of optimum use of the Basin's water resources and in the interest of minimizing adverse effects on the environment be pursued.

Water Quality Monitoring Systems – The present water quality monitoring systems of the Wabash River basin be studied with the aim of expanded coverage including but not limited to 1) additional stations, especially downstream from major wastewater discharges; 2) a more extensive pesticide monitoring program; 3) systematic and extensive montoring for heavy metals; 4) additional time of travel studies; 5) stream flows wherever needed; 6) continuous temperature monitoring at selected stations; 7) nutrient content and related studies in larger reservoirs; and 8) study of brine concentrations in potable aquifers in oil field areas.

### 73. POLICY – LEGISLATIVE

a. That the Wabash Coordinating Committee be continued on an "on call" basis until the Chairman is advised by the Chairman of the Ohio River Basin Commission that the continuation of the Coordinating Committee is no longer required.

**b.** That the needed legislative modification as enumerated below be pursued with maximum vigor.

## LEGISLATIVE MEASURES

| Area of Concern | Measure |
|---|---|
| Water Quality | That the adoption of and especially the enforcement of sewer use ordinances become widespread in the basin. These sewer use ordinances should include regulations that control or prohibit type of waste introduced that may be injurious to the sewer or disrupting to the treatment process and system of surcharges that provides equitable proportionate payment of cost.<br><br>That nutrients from municipal sources be prevented from entering streams where practicable by:<br><br>Prohibition of phosphorus-bearing detergents, as sufficient quantities of safe and efficient phosphorus-free detergents become available, or<br><br>Making phosphorus removal part of the advanced waste treatment process where needed, as shown in the water quality control plan, and<br><br>Making nitrogen removal part of the advanced waste treatment process at larger communities, especially those located upstream from a present or proposed reservoir, as shown in the water quality control plan outlined in the subbasin sections.<br><br>Public Law 566 under which a number of the structural components of the plan would be constructed does not provide for any Federal participation for storage for water quality control. It would appear only equitable and fair that the criteria for including water quality control in small projects would be the same as if a large project were built and that Federal interests would be the same in both cases. In other words, where the beneficiaries are wide spread and augmentation of low stream flow is not provided in lieu of adequate treatment at the source that there should be a uniform federal responsibility in financing the cost for storage for water quality control. |
| Environmental Corridors | There is existing legislation which provides general authority for undertaking the development of an environmental corridor system as recommended in the plan. The Wild and Scenic Rivers Act has not considered any streams in the Wabash Basin. Irrespective of that we believe and conclude that although none of the environmental corridors, in isolation, have national significance, the system as included in the plan has a significant national objective. Accordingly, we believe that the funding for the environmental corridors should be cost shared between the Federal government and non-Federal interests in a 50-50 basis. In other words following the intent of Public Law 89-72, the Federal Water Project Recreation Act and Public Law 566, which enable the federal government to cost share with non-Federal interests on an equal basis. We could not determine that there was any activity and from the more pastorial type recreation activity which would be provided by an environmental corridor system. Accordingly, it is felt that equity could best be served if there was a 50-50 cost sharing on the environmental corridors. |
| Other Environmental | The basin states be encouraged to develop guidelines and the local governments adopt and implement zoning standards and building and sanitary codes designed to protect and enhance the public investment and the recreational, fish and wildlife, and environmental values inherent in natural and impounded waters.<br><br>Public lands in the basin be zoned against indiscriminate use by "off the road" vehicles in order to preserve the quality of the natural environment and to prevent the harassment of wildlife. |

| Area of Concern | Measure |
|---|---|
| Water Supply | The postage stamp theory for water supply supports the theory of everyone paying the same price for the water they use. Some discussion has been accorded to the postage stamp theory for water supply. However, at this time the subcommittee is not prepared to make a specific recommendation thereon. However, we believe that this is a matter that needs to be addressed by the Coordinating Committee. For example, we could not agree that equity was being served wherein the cost brought about by the locational condition one community would require it to pay considerably more than another community for raw water supply. |
| Recreation | In trying to develop a basin plan for water resource development, we find that Public Law 89-72, the Federal Water Projects Recreation Act adds considerable difficulty to developing efficient plans. This difficulty results from the language in 89-72 which pertains to the level of recreation benefits that are inherent in any particular project. P L 89-72 concludes that not more than 50 percent of the cost can be allocated to recreation in any project. In developing basin plans we are concerned with overall efficiency, the overall basin objectives, rather than the specific efficiency of a project and the special objectives of a project. In many cases we find that the best balanced basin plan is made up of imbalanced projects. Accordingly, although the basin plan should meet the requirements of Public Law 89-72, it may be that specific projects would not meet that requirement. We believe that Public Law 89-72 should be revised to reflect that when a project is part of a comprehensive basin plan that it would not have to meet the 50 percent rule if in fact that project was unbalanced in order to provide the most efficient plan. Public Law 89-72 should also be revised to provide for continuing developments at authorized or completed projects wherein non-federal interests have or will have met their obligations under Public Law 89-72. |
| Ground Water | We believe that there must be or needs to be greater identification by virtue of research and study on the quantity and quality of ground water. In all of our deliberations we find that the greatest unknown regarding the specific quantity and quality of the resource lay in the area of ground water. |
| Flood Plain Regulation | The States and subdivisions thereof should be encouraged to develop sound flood plain use plans designated to prevent unwise developments in the flood plain. To this end, a priorities system should be implemented for Federal flood control programs considering first, those areas where adequate and acceptable flood plain zoning has been effected. |
| Site Preservation | That compatible Federal and state legislative authority be obtained to acquire protect and preserve the water storage sites where such sites are required for the long term welfare of the populace and that interim uses be made of these sites for recreation fish and game management, agricultural production and forest management in accord with land use plans to be preared by Federal and non-federal interests. |
| Water Supply Storage | That Title III of Public Law 85-500 (and comparable portion of Public Law 566) be modified to enable the Federal Government to underwrite the cost of providing added storage in projects for municipal and industrial water supply purposes. Provided there is a reasonable expectation that such storage will be required during the functional life of the project; and provided further, that non-federal interests indicate their intent to utilize this water at the time of need with payment and interest to begin at the time of use. |

## 74. IMPLEMENTATION

### a. To Implement

(1) That the Comprehensive Plan, described in Section XVI of this report, be adopted as the basic plan for the conservation, use, development and proper preservation of the water and related land resources of the Wabash River basin.

(2) That the plan be implemented as early as financially practicable in accord with the time frames indicated.

(3) That timely authorization be obtained where necessary by each agency to implement elements of each of the subbasin plans.

(4) It is recommended that special authorization be provided to place priority emphasis upon early implementation of conservation land treatment and management practices above all major reservoirs in the basin as outlined in the comprehensive plan and similar to that carried out in small watershed projects.

(5) Provide special authorization for approximately thirty small watersheds identified in Section XV which are closely interrelated with other developments. Because of these interrelationships concurrent or timely planning and installation of the related projects is essential to provide the most effective and efficient combination of measures.

(6) That the plan elements be subject to modification as necessary and desirable – as more detailed studies progress, in the interest of improved efficiency, increased environmental consideration, the evolving regional requirements and the well being of the populace – all within the framework and thrust of the plan as presented.

(7) That a systematic approach and immediate action be taken to solve water quality problems caused by combined storm-sanitary or sewers, applying sound engineering principles to solve each problem on a case-by-case basis to achieve the most benefit for the least cost, taking into consideration results from present and future research projects as new approaches become available.

(8) That the plan be reviewed and updated periodically each decade to assure that it continues to meet the Basin's needs as the projected needs are transformed into real needs.

(9) The Committee recognizes that channel alterations may be detrimental to environmental values, but the Committee is not convinced that channel alterations must necessarily be detrimental. There is present technology and techniques for channel alterations which can minimize this damage or even improve natural channel conditions. The Committee concludes that each channel alteration be examined in the light of a multiple objective approach within the purview of the National Environmental Policy Act of 1969 (Public Law 91-190) and in consonance with the Fish and Wildlife Coordination Act. Pending this examination such channel alterations should be in accordance with the best practical technology available.

b. To Support

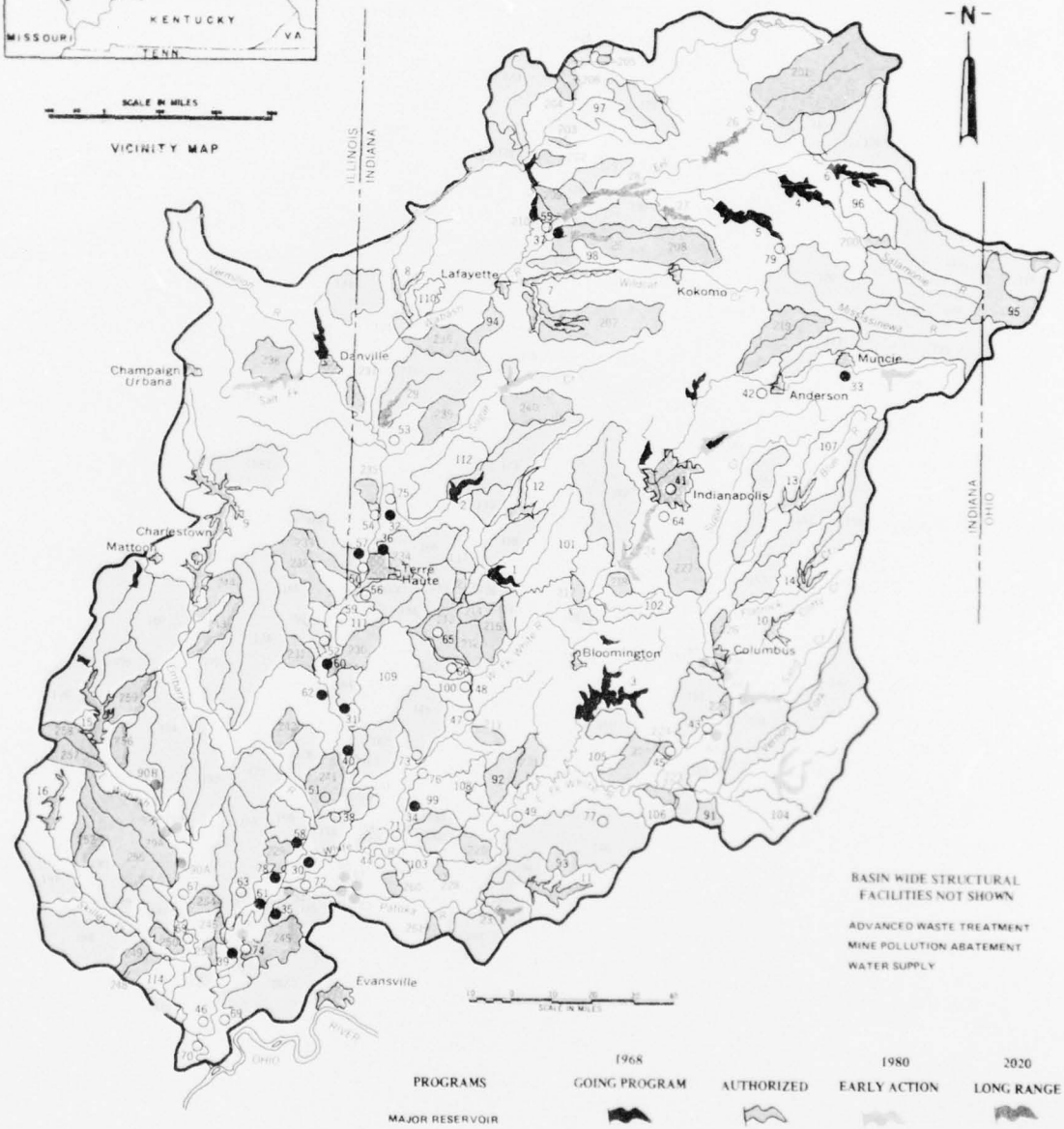
Development of a Comprehensive Water Regulation Plan with an environmental approach commensurate with the natural ecosystems of the basin.

A Comprehensive Environmental Open Space–Land Use Study be initiated, in which particular emphasis be given detailed planning for the environmental corridor and stream fishery systems commensurate with public visitation and wildlife habitat needs and features identified in the environmental inventory be further explored for proper public use or preservation objectives.

# STRUCTURAL MEASURES


SCALE IN MILES

VICINITY MAP




BASIN WIDE STRUCTURAL FACILITIES NOT SHOWN

ADVANCED WASTE TREATMENT

MINE POLLUTION ABATEMENT

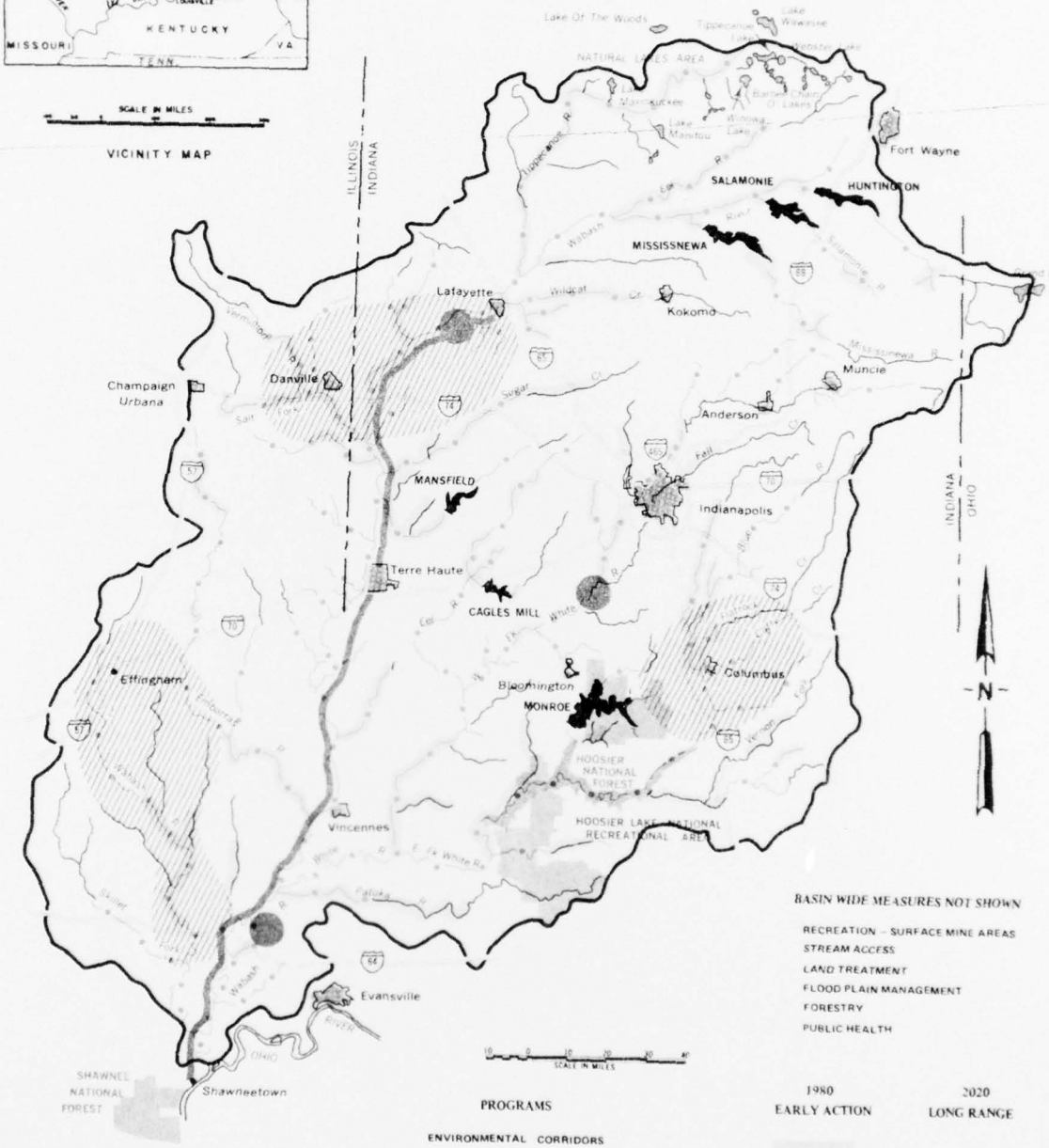
WATER SUPPLY

| PROGRAMS | 1968 GOING PROGRAM | AUTHORIZED | 1980 EARLY ACTION | 2020 LONG RANGE |
|---|---|---|---|---|
| MAJOR RESERVOIR | | | | |
| WATERSHED PROJECT | 130 | 130 | | 130 |
| LOCAL PROTECTION | | | | |

PLATE C–1

# ENVIRONMENTAL, REGIONAL AND SOCIAL MANAGEMENT AND OTHER MEASURES


VICINITY MAP




SCALE IN MILES

*BASIN WIDE MEASURES NOT SHOWN*

RECREATION – SURFACE MINE AREAS
*STREAM ACCESS*
*LAND TREATMENT*
FLOOD PLAIN MANAGEMENT
FORESTRY
PUBLIC HEALTH

| PROGRAMS | 1980 EARLY ACTION | 2020 LONG RANGE |
|---|---|---|
| ENVIRONMENTAL CORRIDORS | | |
| *STREAM FISHERY* | | |
| SCENIC PARKWAY | | |
| PROPOSED OR COMPLETED INTERSTATE HIGHWAY | | |
| POTENTIAL POWER DEVELOPMENT AREAS | | |
| REGIONAL CENTERS | | |

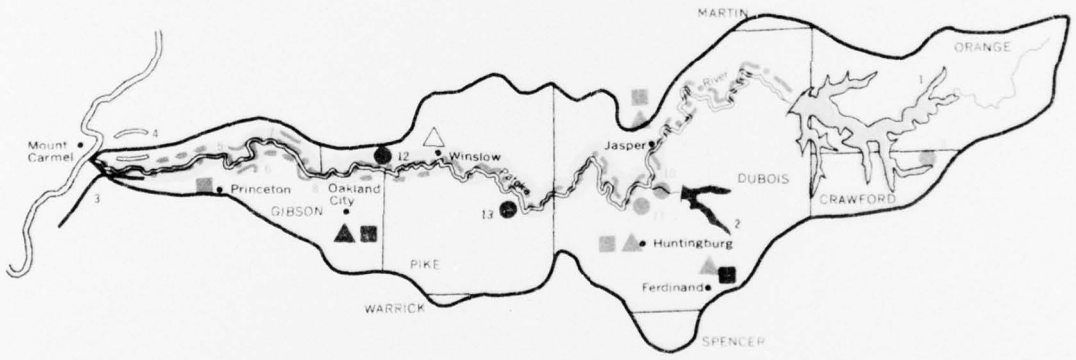
PLATE C–2

# PATOKA SUBBASIN PLAN


SCALE IN MILES

VICINITY MAP

| PROGRAMS | 1968 GOING PROGRAM | AUTHORIZED | 1980 EARLY ACTION | 2020 LONG RANGE |
|---|---|---|---|---|
| MAJOR RESERVOIR | | | | |
| WATERSHED PROJECT | | | | |
| LEVEES | | | | |
| CHANNEL IMPROVEMENT | | | | |
| STREAM FISHERY | | | | |
| ENVIRONMENTAL CORRIDORS | | | | |




| PROBLEM AREAS | EXISTING | 1980 | 2020 |
|---|---|---|---|
| WATER QUALITY (Major Communities) | □ | ■ | ■ |
| WATER SUPPLY | △ | ▲ | ▲ |

SCALE IN MILES

10 0 10

PROGRAMS NOT SHOWN

- ADVANCED WASTE TREATMENT
- MINE POLLUTION ABATEMENT
- WATER SUPPLY
- RECREATION-SURFACE MINE AREAS
- STREAM ACCESS
- LAND TREATMENT
- FLOOD PLAIN REGULATION
- FORESTRY
- PUBLIC HEALTH

PLATE C–3

# EAST FORK WHITE SUBBASIN PLAN

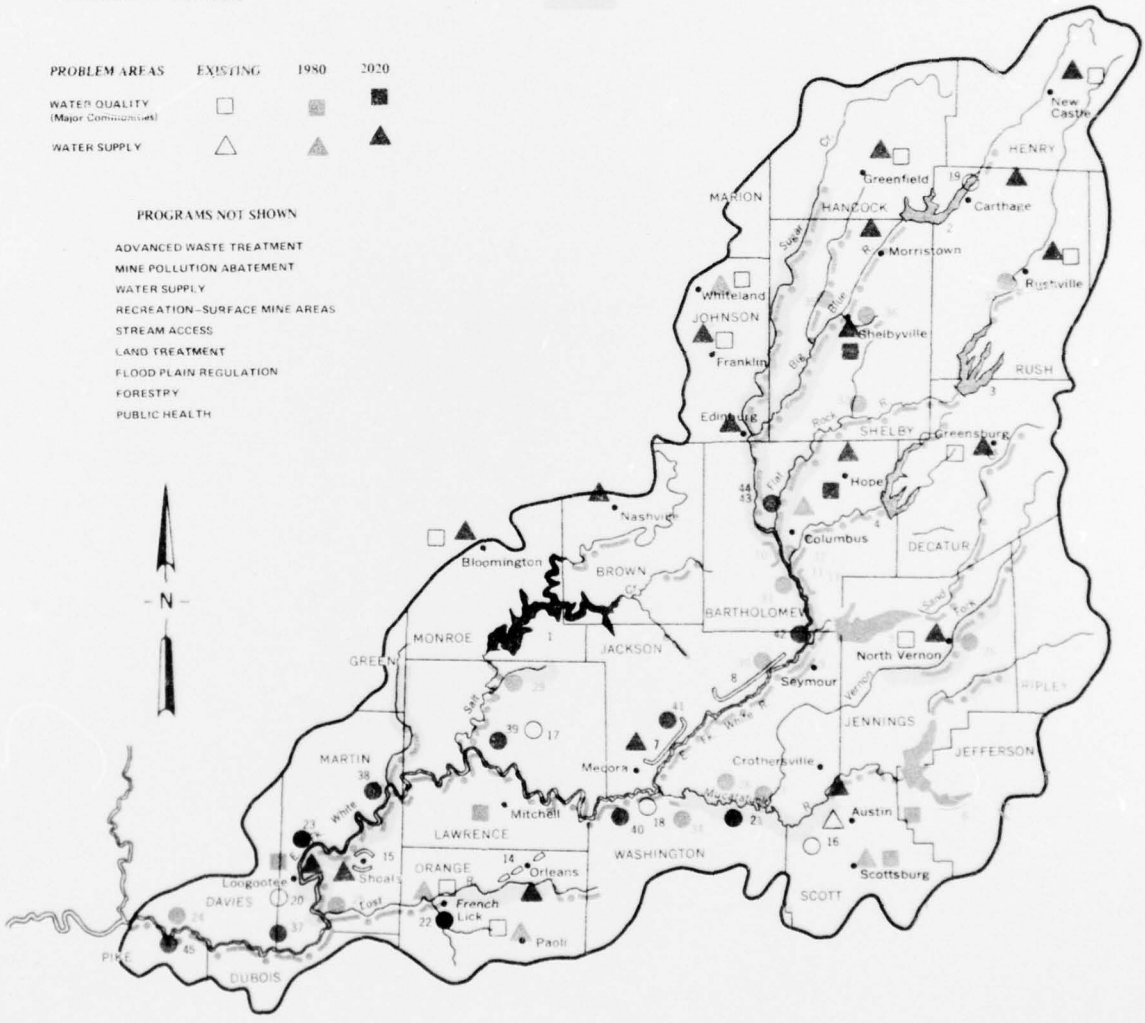

VICINITY MAP

| PROGRAMS | 1968 GOING PROGRAM | AUTHORIZED | 1980 EARLY ACTION | 2020 LONG RANGE |
|---|---|---|---|---|
| MAJOR RESERVOIR | | | | |
| WATERSHED PROJECT | | | | |
| LEVEES | | | | |
| CHANNEL IMPROVEMENT | | | | |
| STREAM FISHERY | | | | |
| ENVIRONMENTAL CORRIDORS | | | | |

| PROBLEM AREAS | EXISTING | 1980 | 2020 |
|---|---|---|---|
| WATER QUALITY (Major Communities) | | | |
| WATER SUPPLY | | | |

PROGRAMS NOT SHOWN

- ADVANCED WASTE TREATMENT
- MINE POLLUTION ABATEMENT
- WATER SUPPLY
- RECREATION–SURFACE MINE AREAS
- STREAM ACCESS
- LAND TREATMENT
- FLOOD PLAIN REGULATION
- FORESTRY
- PUBLIC HEALTH




SCALE IN MILES

10 0 10

PLATE C–4

# WEST FORK WHITE SUBBASIN PLAN

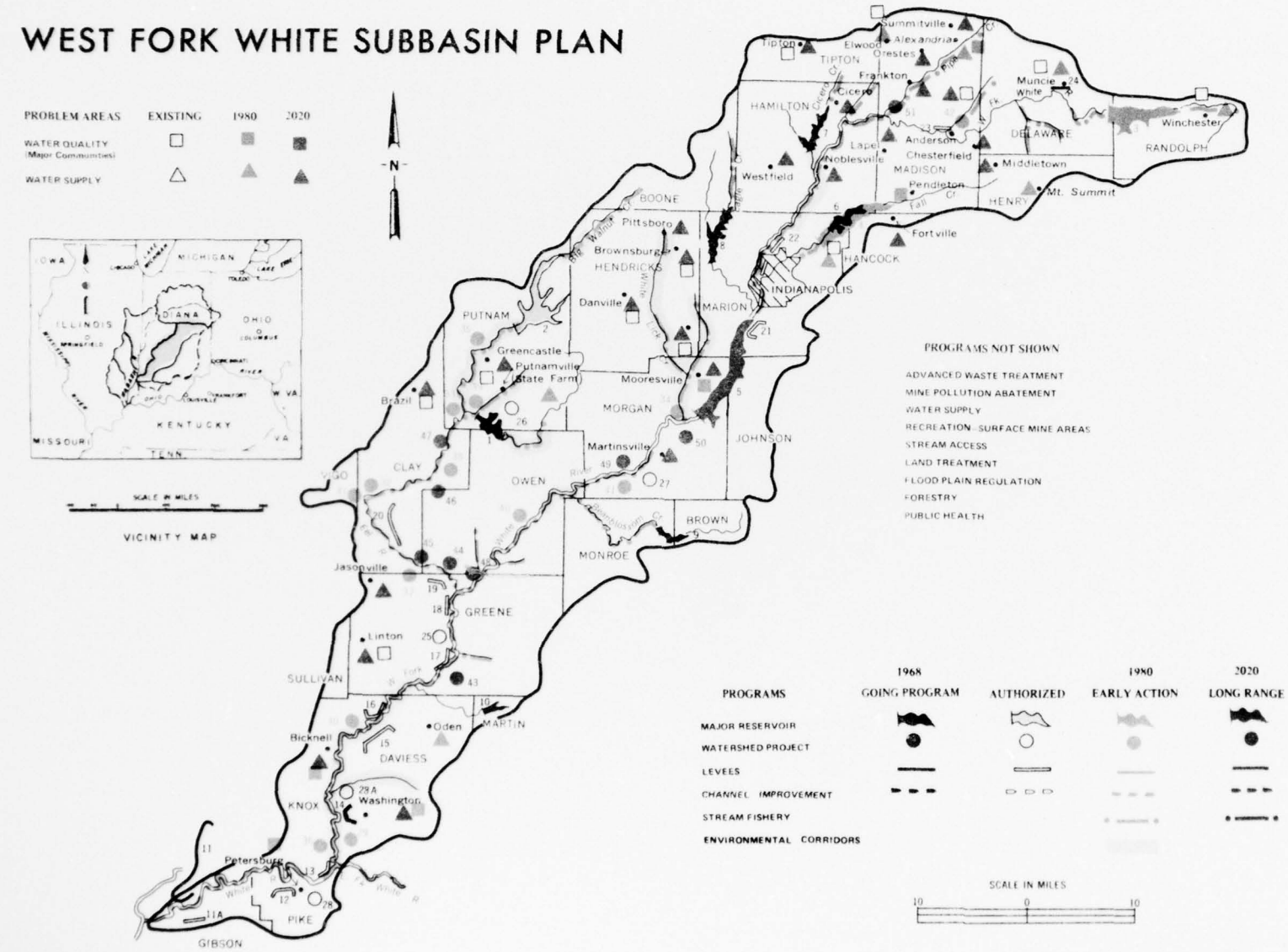



PLATE C-5

# UPPER WABASH SUBBASIN PLAN

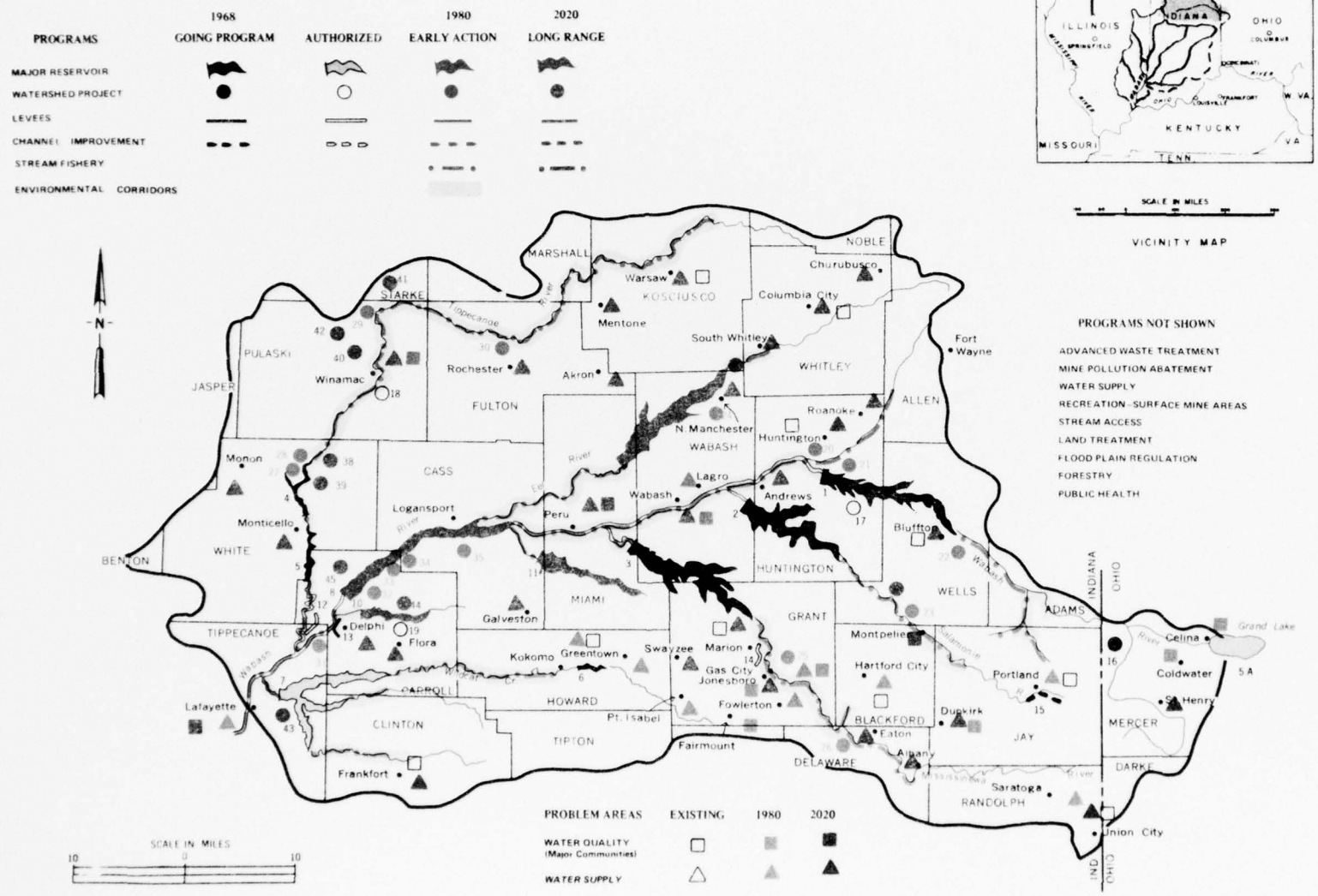
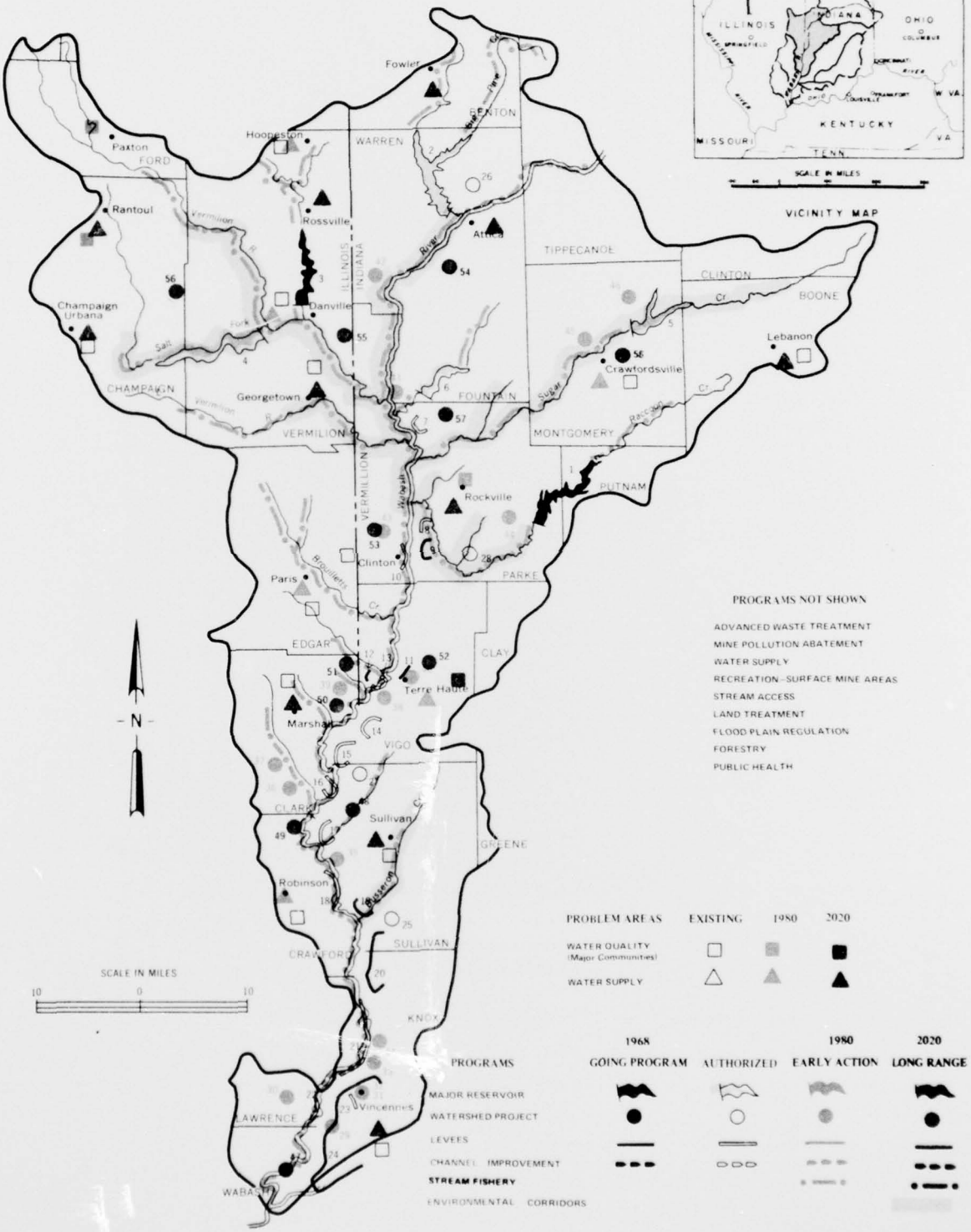



PLATE C-6

# MID WABASH SUBBASIN PLAN




PROGRAMS NOT SHOWN

- ADVANCED WASTE TREATMENT
- MINE POLLUTION ABATEMENT
- WATER SUPPLY
- RECREATION-SURFACE MINE AREAS
- STREAM ACCESS
- LAND TREATMENT
- FLOOD PLAIN REGULATION
- FORESTRY
- PUBLIC HEALTH

| PROBLEM AREAS | EXISTING | 1980 | 2020 |
|---|---|---|---|
| WATER QUALITY (Major Communities) | □ | ▩ | ■ |
| WATER SUPPLY | △ | ▲ | ▲ |

| PROGRAMS | 1968 GOING PROGRAM | AUTHORIZED | 1980 EARLY ACTION | 2020 LONG RANGE |
|---|---|---|---|---|
| MAJOR RESERVOIR | | | | |
| WATERSHED PROJECT | ● | ○ | ● | ● |
| LEVEES | | | | |
| CHANNEL IMPROVEMENT | | | | |
| STREAM FISHERY | | | | |
| ENVIRONMENTAL CORRIDORS | | | | |

PLATE C–7

# EMBARRAS SUBBASIN PLAN


SCALE IN MILES

VICINITY MAP


PROGRAMS NOT SHOWN

- ADVANCED WASTE TREATMENT
- MINE POLLUTION ABATEMENT
- WATER SUPPLY
- RECREATION--SURFACE MINE AREAS
- STREAM ACCESS
- LAND TREATMENT
- FLOOD PLAIN REGULATION
- FORESTRY
- PUBLIC HEALTH

| PROBLEM AREAS | EXISTING | 1980 | 2020 |
|---|---|---|---|
| WATER QUALITY (Major Communities) | □ | ■ | ■ |
| WATER SUPPLY | △ | ▲ | ▲ |

| PROGRAMS | 1968 GOING PROGRAM | AUTHORIZED | 1980 EARLY ACTION | 2020 LONG RANGE |
|---|---|---|---|---|
| MAJOR RESERVOIR | ≈ | ≈ | ≈ | ≈ |
| WATERSHED PROJECT | ● | ○ | ● | ● |
| LEVEES | — | — | — | — |
| CHANNEL IMPROVEMENT | - - - | ⊐⊐⊐ | - - - | - - - |
| STREAM FISHERY | | | - - - | - - - |
| ENVIRONMENTAL CORRIDORS | | | • — • | • — • |

PLATE C–8

# LITTLE WABASH SUBBASIN PLAN


SCALE IN MILES

VICINITY MAP

PROGRAMS NOT SHOWN

- ADVANCED WASTE TREATMENT
- MINE POLLUTION ABATEMENT
- WATER SUPPLY
- RECREATION–SURFACE MINE AREAS
- STREAM ACCESS
- LAND TREATMENT
- FLOOD PLAIN REGULATION
- FORESTRY
- PUBLIC HEALTH




- N -

SCALE IN MILES

10 0 10

| PROBLEM AREAS | EXISTING | 1980 | 2020 |
|---|---|---|---|
| WATER QUALITY (Major Communities) | □ | ■ | ■ |
| WATER SUPPLY | △ | ▲ | ▲ |

| PROGRAMS | 1968 GOING PROGRAM | AUTHORIZED | 1980 EARLY ACTION | 2020 LONG RANGE |
|---|---|---|---|---|
| MAJOR RESERVOIR | | | | |
| WATERSHED PROJECT | | | | |
| LEVEES | | | | |
| CHANNEL IMPROVEMENT | | | | |
| STREAM FISHERY | | | | |
| ENVIRONMENTAL CORRIDORS | | | | |

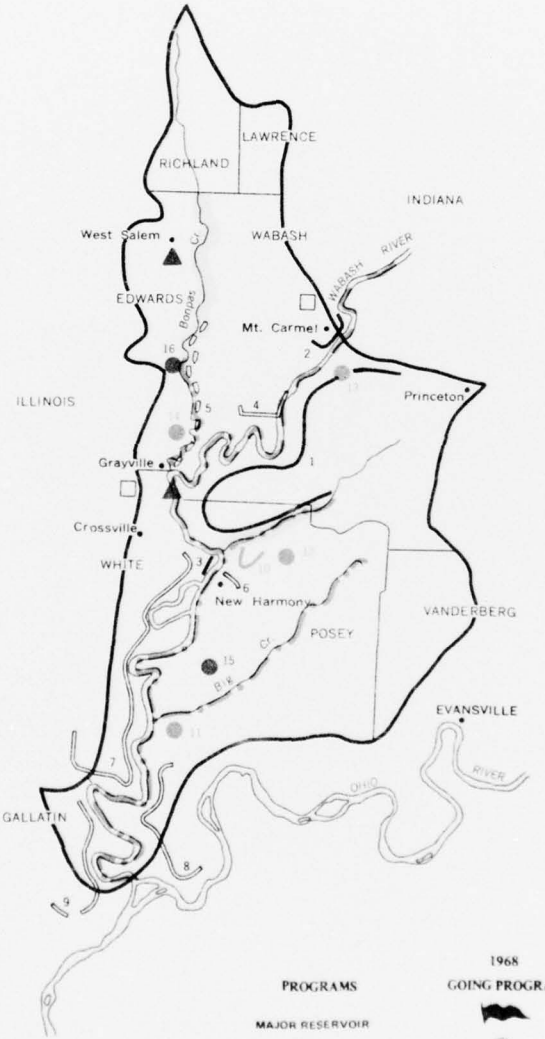
PLATE C–9

# LOWER WABASH SUBBASIN PLAN


SCALE IN MILES

VICINITY MAP


| PROBLEM AREAS | EXISTING | 1980 | 2020 |
|---|---|---|---|
| WATER QUALITY (Major Communities) | □ | ■ | ■ |
| WATER SUPPLY | △ | ▲ | ▲ |




PROGRAMS NOT SHOWN

- ADVANCED WASTE TREATMENT
- MINE POLLUTION ABATEMENT
- WATER SUPPLY
- RECREATION--SURFACE MINE AREAS
- STREAM ACCESS
- LAND TREATMENT
- FLOOD PLAIN REGULATION
- FORESTRY
- PUBLIC HEALTH

| PROGRAMS | 1968 GOING PROGRAM | AUTHORIZED | 1980 EARLY ACTION | 2020 LONG RANGE |
|---|---|---|---|---|
| MAJOR RESERVOIR | ■ | ○ | ● | ● |
| WATERSHED PROJECT | ● | ○ | ● | ● |
| LEVEES | ▬ | ▬ | ▬ | ▬ |
| CHANNEL IMPROVEMENT | ▬ ▬ | ▭ ▭ | ▬ ▬ | ▬ ▬ |
| STREAM FISHERY | | | ▬ ▬ | ▬ ▬ |
| ENVIRONMENTAL CORRIDORS | | | ▒ | ▒ |

SCALE IN MILES

10 0 10

PLATE C–10